1937 AMAZING STORIES

NOINE STORIES April 1937 25 Cents JONES NOO BINDER S.G. WEINBAUM

#### THOUGH WOMEN CALL IT

# Beauty Bath for Teeth

## MEN WHO SMOKE A LOT WELCOME IT



TALK to the men who smoke a Tiot... watch the men in pull-mans...you will find that most of them use Listerine Tooth Paste—the tooth paste that's all tooth paste made by the makers of Listerine. They have probably been told about it by their wives, who call this unusual tooth paste a beauty bath for the teeth.

#### SPECIAL FORMULA

In Listerine Tooth Paste is a special and exclusive combination of cleansers—held in exact balance for perfect cleansing. They are neither too hard not too soft—just right. Hardenough to remove deposits, stains, and bacteria from the enamel, but not hard enough to injure the precious enamel itself. Excessive smokers find it especially beneficial.

Blended with these cleansers are delightful fruit essences which leave the mouth clean as a whistle. A two weeks trial will convince you.

LAMBERT PHARMACAL CO., St. Louis, Mo.



A TONIC FOR THE GUMS

WHEN USED WITH MASSAGE

## READ THESE 8 True Experiences.

## of Men I Trained at Home For RADIO

















## N YOU AT HOME in Spare Time FOR A GOOD RADIO JOB



J. E. SMITH, Presi National Radio Institute.

MAIL COUPON





# AMAZING STORIES Science Fiction

Vol. 11

**APRIL**, 1937

No. 2

#### CONTENTS

0011121112	
Editorial	
Waves	12
Serial:	
"By Jove!" (Part II) Walter Rose, L.D.S., R.C.S.	61
Stories Complete in This Issue:	
Twin Worlds Neil R. Jones	17
The Chemical Murder Eando Binder	91
Shifting Seas	115
Science Questionnaire	16
In the Realm of Books C. A. Brandt	133
Discussions	135

Cover and Illustrations by Morey
Our Cover depicts a scene from the story "Twin Worlds"

Published Bi-Monthly by

TECK PUBLICATIONS, INC.,
Office of publication, 29 WORTHINGTON STREET, SPRINGFIELD, MASS.

Executive and Editorial Offices: 461 Eighth Avenue, New York, N. Y. Lee Ellmaker, Pres. and Treas. B. M. Bolcopi, Sech.

All rights reserved. Entered as Second Class Matter at the post office at Springfield, Mass. 25c a copy, \$1.50 a year, Canada and Foreign Countries, \$1.71.

Bubertiers are cettified to the next date of laws.

Of the next date of 1880e.

English Agent--Atias Publishing & Distributing Co., Ltd., 48, Bride Lane, Fleet St., Lendon, E. C. 4, English





#### \$TART \$1260 to \$2100 YEAR

MEN - WOMEN
Many 1937 appointments

Franklin Institute Dept. W241 ROCHESTER, N. Y.

Mail Couper Today—

Gentlemen: Rush to me FREE of charge, list of U.S. Government big pay jobs. Sen me FREE 32-page copyrighte book describing salaries, vacations hours, work, and full particular

Name.....

#### A NEW SKIN IN 3 DAYS



Read This Free Offer!

Third by beginn of one monthly have been been been during the constitution of the cons



FOLLOW THIS MAN
Secret Service Operator No. 18 is on the children disserted Competer of Long. Telestale factor points in membered crit's room.

Free The Confidential Report
For the Confidential Report
to the chief, Print for it.

Earn a Regular Renethy Salary

Earn a Regular Monthly Sales
You can become a Finger Print Expert at
10 your space time, at small over. Write fi
10 fidential full report and default. Likenius
NOT be sent to boys under 17 years of AgINSTITUTE OF APPLIED SCIENCE
1520 Experted Are.

## **Do You Want A Baby?**



for years from functional sterility, and even often told they could never have even of the told they are to the told they are to the told they are told they even told they even

#### **Get This Knowledge FREE**

veloped this home method, which is described in my libratrated treatis each FEES (ON REGUEST). It discusses many subjects relating to the female orizons and tells how you too may combat your troubles as those eanied of others have who reported arrival of bables after being children and to other have who reported arrival of bables after being children troubles amenable to correction by this home method, OR. N. WHI. ELDERS, TOM & FeIR SE. S. SHER 1844. N. S. JAGSEPH, MISSOURE

FACTORY SALE—BELOW COST 25 Cal. Automatic \$5.95 Vest Pocket Size 5

Vest Pocket Size J

Model 696-7, abot; fine-hine, steel; securate; safety; fint model. Length contail; 4.5°, wt. 15 cs. 3pecial 33.95

10 Shot Mil. Model—697

10 Shot Mil. Model—697

10 Shot Mil. Model—697

10 Shot Mil. Model—697

10 Shot Mil. Model—698

10 Shot Mil. Mo

Tridica: 25 Cal.—See; 32 Cal.—The per box of 28. \$2 Despois traguized on 0. 0. 0. t—send M. Q. in full and as charges. None rold to minors. Catalogr—SS'W. Colts, Rifes, Air Guns, ctc. Send 3c stemp. LEE SALES CO. (Dept. FN), 35 West 22nd St., M. Y. City

GAMBLERS' SECRETS EXPOSED
Best The Chest (see book) espoes Carfe. A new wags to readwithout taking card off too, 6 Alage the secrets. Missers passers
Making any polat with fair dice, liaces, Brock Market, Latest resides
Novelties, See all 1,00 to Specialty Exposis, See 2468, K. C., 88.

## PILES W

DON'T BE CUT
Until You Try This
Wonderful Treatment

for pile suffering. If you have piles in any form write for a FREE sample of Page's Pile Tablets and you will bless the day that you read this. Write today. E. R. Page Co., 488-B8 Page Bldg., Marshall, Mich.

#### FOREST JUBS

available at \$125-\$175 per month, steady. Cabin. Hunt, trap, patrol. Qualify at once. Get details immediately.

STUDY AT HOME
Longily trained men win higher
positions with 160 (Contractory)
trained more than every before. High
operations will be the state of t

We guide rou steep ye steep. You can brain at home during spore this, begane of the for contrained from the formation at the steep of the steep own cost, early farm, (as our vanishing terms of the steep own to be steep of the steep own to be steep of the steep own to be steep of the steep of the steep own to be steep of the steep own to be steep own to be steep of the steep of the steep own to be steep



# ARE YOU JUST HOPING TO LAND

## IN A GOOD JOB?

Hore without foundation is pretty futile in this competitive age! But hope plus training is a winning combination — and all over this country today, in all kinds of professions and trades, men are getting ahead—landing in good jobsearning more money—because of serious and systematic study of international Correspondence Schools' courses. These courses are giving them the training they need. Investigation will not put you under any obligation, Mail the coupon

# Without cost or oldigation, please send on a copy of your booklet, "Who Wins and Why," and full particulars about the subject before which I have marked X; Why," and full particulars about the subject before which I have marked X; Constituting Darkman Constitution of the Constitution

## Will Show YOU an Amazingly Easy

MANY MAKE \$30-\$40-\$50 A WEEK COYNE BOARE "30 "40 "30 A WEEK COYNE PARCICAL" (Learn by Doing" shop training enabled H. C. Omer to earn more them 570 a week, with our furnished. He sent for facts about this most These facts are your FIREM Medi couppe below. Hundred are making more money because they sent for the big FIREM COYNE BOAK.

EASY PAYMENT PLAN n't let lack of memer keep yee from sending the coupen tel you how you can get Training first pand pay tuttion or. I'll size rush details of my new low cost board and room n. So send along the coupen.

LEARN BY DOING In Big Coyne Shope in 12 Weeks at a Hene Study Course. No taxt books. You work and of interesting lobe-on full size motors, switch



## COYNE ALECTRICAL SCHOOL

☐ RADIO Address.....

\$2.00 treatment which you may try under 30 day refun to at our risk, 'ARLEE CO. H-12, BALTIMORE MC

## INVENTO

CLARENCE A D'ERIEN & HYMAN BERMAN Registered Patent Attorney

#### **FACTORY TO YOU**

Free Trial

AT LAST! The tamous Reminyton NOISELESS Pertaklas in commit or only tenestic a day. Bertaklas in commit or only tenestic a day. Bertaklas in committee the properties of the committee of the com



#### DEAFNESS IS MISERY

ble Tiny h

A. O. LEONARD, Inc., Suite 23, 70 5th Ave., New York

#### **HELP YOUR KIDNEYS** with real santalwood oil

Santal Midy Capsules bring results because they contain real East Indian santalwood oil. This soothes kidney and bisdder passages. Used by millions the world over. At druggists.

CAPSULES 4/04

#### and YOU'RE THE MAN

Are you hunting a bigger job, or does the bigger job hunt you? Why waste yours learning through routine work, when you can acquire in your spare time in a comparatively few months the experience and specialized knowledge which bring promotion and salary increase? Thousands of men have increased their monemes by home-study business train------ Find Yourself Through LaSalle! --

ing under the LaSalle Problem Method. Let us show you how you can do just as well or better. The coupon will bring you complete information about our "experience training" in the business field you check, together with details of our consensed pay-ment plan. Make your start toward that bigger job today.

LASALLE EXTENSION UNIVERSITY, Dept. 375-R, CHICAGO Picase tell me about your salary-increasing plan for my advancement in the business field checked. Send also copy of "Ten Years' Promotion in One," all without obligation.

O Business Management
O Modern Salesmanship
O Higher Accountancy
O Traffic Management
O Railway Station Management
O Law: Degree of LL. B.
O Commercial Law

O Industrial Management O Modern Foremanship O Personnel Management O Modern Business Corres

O Business English O Stenotypy.
O Effective Speaking O Credit and Collection Correspondence

Street & Number

..... State.....

## Boy! MONEY Big PRIZES



BOYS—12 to 16: Here's a speedy, fully equipped bicycle for you, Trimmed in chromium; baked-on enamel. Flashy appearance; neatly streamlined. Balloon "cushioned" tires, Three hundred other big prizes I Earn the bike, or any other trize

Earn the hike, or any other prize that you want, and make CASH PROFITS, besides. It's easy, It's fun. Just obtain customers in your neighborhood and deliver our magazines to them. Need not interfere it in spare time. Many boys earn a prize the very first day, Perhapa you can, too. Mail the coupon. Mail This Coupon at Once

Mr. Jim Thayer, Dept. 693
The Crowell Publishing Co.
Springfield, Ohio

Springheld, Ohio

Dear Jim: I want to earn MONEY and PRIZES. Start me at
once and send me a Prize Book showing 300 items boys can earn.

Name\_\_\_\_Age\_\_

City\_\_\_\_\_\_State\_



## ATiny Gland Robbed Me of Sleep...

Until I Read This Amazing Book

## FREE TO MEN PAST 40!

a su saurted soon atter ! was 40 . . . ! fearted ; setting the injabts. More and more often ; setting the injabts. More and more often frequent headaches. Pains in my hips. Weak trief feeling and pain in my hack. I get itree feasily. Got the blace too often—thought I what these symptons indicated—until I read that amazing little book "Why Many Men that they symptons indicated—until I read that amazing little book "Why Many Men I realized by our little experiments of the control of

protesta.

But grandest of all to me was the revelation of the amazing modern relief that has
men had helped themselves to new confort.
So easily! Without drugs. Without diets...
exercises. measage! Through a tested,
exercises. measage! Through a tested,
the state of the conformation of the conformation

"Why Many Men Feel Old at	40." Here
is the complete, detailed ext	lanation of
a major possible cause of ma	on of mouse
a major possible cause of ma	my or your
symptoms. And the am	azing news,
complete, of the Thermalaid	outfit thou-
sands have said they "would	n't sell for
\$100 if they couldn't get anot	her." Write
for this book today-it may me	
for this book today-it may m	tati a whole
new world of comfort for yo	u. Address
ELECTRO THER MAL .	
COMPANY, 4812 Morris	ELECTRO T

Men past 40 . . . send for this book

If you live west of Reckies, address The El tro Thermal Co., 500 W Fox Building, Dept. 48-Los Angelet, Calif. In Cada address The Elec Thermal Co., Derk 48-53 Young St., Toront Canada.

u, 2	Addres	8		
-				
FIF	CTRO	THER	MAL CO	
			Strubenvilli	e. Ohio.

THIS

BIKE

	Without obligation to me, so of your confidential book, "Why Are Old at 40," with details of home method for prestate glas and 30-day Trial Offer.	Many	Mer
i	Nome		
ľ	Address		
-	The state of the s		

Please mention NEWSSTAND FICTION UNIT when answering advertisements

#### NOW, YOU, TOO CAN LEARN TO PLAY MUSIC

... this easy as
A-B-C way

No Special Talent Necessary
... You Learn at Home—
Without a Teacher



FREE BOOK: Send your name and address for illustrated booklet and demonstration lesson, free, Convince yourself you can learn to play. Read how others have gained popularity, good times, extra money, Mention instrument preferred. Instruments supplied when needed, cash or credit. U. S. School of Music, 3093 Brunsieh Bidap, New York Cuty, N. Y.

## Sawe HALF OR FALSE TEETH

We make YOU fine fitting, beautiful teeth by
mail on money-back Guarantee. We
are one of America's largest Denial Orsenizations, and therefore can SAVE
you make John 18, 30 years one of the senior of the seni

DR. CLEVELAND

628 Washington Ave., ST. LOUIS, MO.

## WANTED POEMS, SONGS

For Immediate Consideration . . . Send Poems to COLUMBIA MUSIC PUBLISHERS, Dept. 17, TORONTO, CAM.





A Good Position Will Be Ready for You TRAINSD MEN — 35 to 50 — are wanted of stantity as Reviews and Has Passeners Are Inspectors. Simple, home-study course on to 1835 per month piles expenses, to start, refund fastion. Advance with expensions. E Positet outliess our 18-yr, secret, 37 ANASAR DUSHRESTRAMENTO SECTION.

#### GOLD MEDAL Haarlem Oil Capsules

.Fine for Weak Kidneys and Bladder Irritation

#### STOP GETTING UP NIGHTS

One 35-cent box of these famous capsules will put healthy activity into your kidneys and bladder—flush out harmful waste poisons and acid and prove to you that at last you have a grand diuretic and stimulant that will swiftly cause these troubles to cases.

cause these troubles to coses.

But be sure and get GOLD MEDAL Haariem Oil Capsules—safe and harmless—the
roriginal and genuine—right from Hassiem in
Holland. Millions have kidney and bindder
trouble and never suspect it—some gyamptoms
are the complex of the complex of the complex of the
most palms, puffy eyes and scanty passage that of times grants and burns.

## FIS'

Anyone suffering from Firtule, Piles or any Rectal treet is urged to write for our FREE Book, describing the McCleary Treatment for these treacherous rectal treeble The McCleary Treatment has been successful in thousand of exect, Let us send you cur reference list of from

#### Stop Drink Habit

income and soon his curring for whister, here or only a look disagram. New, proven breakports, physicals or prescribios, from personally new, proven presentable, from personal neture size habits. Safe -- doors 't meet atomach, 'Rouseads beautic size habits, Safe -- doors 't meet atomach, 'Rouseads beautic striffection gravanated. A laisted postated in plais wropper for St. O. O. D. If desired, plus s few cents additional charge, Order to an CRAVEX CO. Dopt. 13.9, P. O. Box 542, Burbank, Calif

#### NO JOKE TO BE DEAF

Bir, Way much himself bear he watch lick affer being ded for twenty-free years, withhis Article last Drume. He were them day and high their graph about the head and comfortable, nowines or batteries. With for TRUE STORY. Also Artificial Der Drum bookleden Desir www. COMPANY.

#### Taking Orders For The NIM ROD Lis Earn more every day in the year representing you established from with a complete Man of for adding necessifiest Dress Strira, Work Shirt Fole Strira, Neckwese, Underwere, Dress Orders Strira

Laioccata, Salla, Shoes, Gelferma. Every iteuaranteed.

Experience Umscoessary.

With quick for FREE SALES OUTFIT.

NIMROD GO., Dept. 75.

## ACCOUNTANT

aSalle Extension University, Dept. 275-8, Chicago
The School That Has Trained Over 1,350 C. P. A.'s





GIANT

## NG DOEM

SEND FOR FREE BOOKLET revening SECRETS OF SUC-ESSFUL SONG WRITING, including free copy of valuable thyming Digitionary and information on surrent market requirements. Type write posms or compose meledies, SEND FOR OUR OFFER.

M. M. M. PUBLISHERS Dapt, NS2 Studio Building

Portland, Ore.

#### ANY PHOTO ENLARGED

SEND NO MONEY Just

GIVE ME YOUR MEASURE

No other Physical Instructor in the World has ever DARED make such an offer !

such an offer!

III. for you not prove you want to make you want to make a man of might and muscle. Right in the man of might and muscle. Right in the providence and feel the limit of the providence and "your body. Soon you are the proof owner of a grown of the providence and "your bad," because you have been your frace, the sportle in your class, the goalet in your class, the goalet is your class that you want is not the providence of the providence o Are you underweight? I'll add pounds where needed! Are you fat in spots? I'll pare you down to fighting trim!

And I'll also give you rugged health that banishes constipation, pimples, skin blotches and similar conditions that rob you of the good things of life! I haven't any need for contrap-tions that may strain your

tions that may stram your heart and other vital organs. I don't dose you or doctor you. Dynamic Tension is all I need. It's the natural, tested method for developing real men inside and out.

48-Page Book FREE

Tells all about my method and what it has done to make his-mussled men out of run-down specimens. Shows, from actual photos, became a superstance of the same for you too. Don't keep on being only half of the state you CAN be! Put your name mail is today. CHRAIGES ATLAS, Dept. 9-R, 115 East 20rd Street, New York, N. Y. CHARLES ATLAS, Dept. 9R 115 East 23rd Street, New York, N. Y.

I want the proof that your system of Dynamic-Tension will make a new man of me—give me a healthy, heaky body and hig muscle develop-ment. Send me your free book, "Everlatting E YOUR name

Name..... (Please print or write plainly)

...... State.....

Address. Please mention Newsstand Fiction Unit when answering advertisements

CHARLES ATLAS

TODAY

This valuab solid steeling si yer cup stan

## FALSE TEETH 60 DAYS

I have thousands of satisfied cus-

tomers all over the country who could not afford to pay big prices. I have

been making dental plates for many years, by mail.

I guarantee you satisfaction or they do not cost you one cent, and I take your word. Teeth made especially for you personally can be tried for sixty days. In one Pennsylvania town alone, 91 people are wearing teeth made by me. They are satisfied and saved money.

#### My plates are very beautiful to look at and are constru-to give life-long service and satisfaction. You can You can look

to give ille-iong service and satisfaction. You can look younger at once. They are made with pearly white FREE square porcelain teeth. Well fitting with the pearly white provided the pearly with the the

DR. S. B. HEININGER, D. D. S. 440 W. Huron St., Dept. 374, Chicago, Illinois



Get ready for a Better Job and More Payl I'll train you at home on Practical Work to get experience and until In Position, I fumish all tools and draw-Ing table. Earn your way while you learn in spare time. No previous experience needed. Successful since 1900. Many opportunities in drafting. Prepare now! Write for Free Book.

ENGINEER DOBE, DIV. 3033 LIBERTYVILLE, ILL.



SALARY TO START 90 to 175

Werator Conde rder Patrol INSTRUCTION SERVICE, Ocpt. 112, St. Lo

18 to 50

#### OPPORTUNITY AD-LETS

Rate-Eight cents a word, Cash should accompany all advertisements unless placed by an accredited advertising agency. Advertisements of less than 10 words not accented

> TECK PUBLICATIONS, INC. 461 Eighth Ave., New York, N. Y.

#### Correspondence Courses

USED Correspondence Courses and Educational Books sold or rented Incorpositive. Money-back guarantee. Write for Free Catalog listin 4969 barrains. (Courses boursh), Lec-Mountain, Pisrah, Alabama

#### Manuscripts Wanted

WANTED: Authors manuscripts for immediate marketing, Free examination, Seed manuscripts to Revel Syndlesis, 41 West 46th

Musical Instruction

PLAY piano, professional style, by ear or note in two months. A "sound" system. Rooklet free, Joe Routher, Roy 12-e, Ottawa, Can.

## **STOP Your Rupture**



Why worry and suffer any longer? Leas about our perfected invention for all form of reducible rupture in men, women as children. Support fitted with automatic a cushion assissin Nature in a natural strengt ening of the washened muscles. Thousan made happy. Weighs but a few ounces, mance nappy, Weights but a few ounces, in conspicuous and sanitary, No still grant of the control of the contro

BROOKS COMPANY, 174-F State St., Marshall, Mich.

## Clean Out Poisonous Acids

Ciem Out Poisonous Acids
You Edesya contain 9 million trust tubes of filters which
For a contain 9 million trust tubes of filters which
Fe careful. If functional Kighney or Bidder disorders make
Fe careful. If functional Kighney or Bidder disorders make
Great which was a contained by the contained of the contai

#### High School Course

Many Finish in 2 Years

nalietin on request. No obligation.

#### THIS IS THE FRIEND YOU SEEK!



The frames Ferrogen astrology.

He will sitte who are your friends, and you in a strology.

He will sitte who are your friends, and you in marriage and specialistics, information regarding travels, and you in marriage and specialistics, information regarding travels, and your a few formation of the property of your baris for palping purposes.

You want to be a property of the pro

Postage to Holland is 5 c. Kindly enclose 20 c. in stamps (no coins) for postage and handling.

Address PROFESSOR SAHIBOL LAKAJAT
Dept. 672B, Postbox 72 - Den Haag - Holland.

-Buy your Drug Sundries, Specialties, Supplies, Blades, etc., direct from manufacturer through our Mail-Order Dept. All personal items are mailed postpaid by us in plain, sealed package. We have everything. Send for Free, illus-trated mail-order catalog.

#### THE N-R MFG. CO., Dept. H-37, Box 353, Hamilton, Ont. THOUGHT TRANSMISSION

Patented communication system enabling individuals to read and transmit thoughts secretly in public. Can be learned in two hours, Endersed by police, institutions, businesses. Send \$1.00 for com-plete system. ATTENTION DEAF MUTES. HONIGMAN EYE LANGUAGE INST., 4., 4853 J Manco, Montreat.

TREATMENT mailed any sufferer on trial. If satisfied, send \$1. If not, don't. Write today. W. K. STERLINE

THE MOVIE STAR Hollywood movie stars, including Buddy Rogers, Lee cluding Buddy Rogers, Lee r, Cesar Romero, choose Roseoliff shirts b are up-to-the-minute, One year guarantee sulling, Experience unnecessey, Big Dally ssions; Cash Bonuses, Complete ascople lin Dept. N-3, BOSECLIFF, 1239 Broadway,

850 Ohio Ave., SIDNEY, OHIO



## WANTED AT ONCE

Mother, Rome, Lave, Patriatic, Sacred, Comic ar any subject. Don't delay-send poom taday for our offer. RICHARD BROS., 27 Woods Bldg., Chicago, Ill.



MONEY IN ELECTRICITY Do you want a BETTER JOB—MOJ MONEY and a future free from worry. Then send for my big free El trical Book Today and learn the FAC about the amazing opportunities in El tricity — AND — bow this new mode icity — AND — bow this new me b-to-date Practical Home Shop Tra m helpyouqualify for these opportun

OPPORTUNITIES TO EARN UP TO \$5.00, \$10.00 A WEEK AND MORE WITH SPARE TIME WORK

WHILE TRAINING
white tell you bow to DO these jobs, furnish
real electrical equipment and supplies for
many of them, ased give you valuable
sales and Advertising helps to show you
how to Sell Your Services. In fact, it
bould take only one or two small white bould take only one or two small ; nontb to more than make the tra PAV FOR ITSELF.

TRAINING IN RADIO, REFRIGER-ATION, AIR-CONDITIONING,

DIESEL ELECTRIC POWER AND MANY OTHERS INCLUDED My book also tells bow E. I. Training helps YOU to INCREASE YOUR EARN-ING power at 77 helps YOU to INCREASE YOUR EARN. NG power still more by including train-ing in these big, important branches of Electricity. Each one practically an in-lustry in itself—each one a complete field —yet, you get all of these and more in E. I. Practical Home Shop Training.

GET INTO A GROWING FIELD FOR A BIG PAY FUTURE

GET INTO ELECTRICITY—get into a field that is growing and expanding—get into a field where opportunities for REAL JOBS and REAL MONEY await the TRAINED MAN. But, we don't want you to take our and for it. We want you to judge for uself the value of this new modern up-date Training method—where you learn Real Electrical Equipment and Apon Real Esectrical Equipment and a paratus—right in your own home. So set for my Big Electrical Book TODAY for full Information on this new easy, in-teresting and Profitable Practical Home Shop Training. Remember this book

cost you nothing—puts you under no obligation and NO SALESMAN WILL CALL ON YOU.

Electrical Shop

THIS BIG

ELECTRICAL BOOK

	H. W. Petersen, President	
ь.	ELECTRIC INSTITUTE, Inc.	

Sept. 57C. Hinsdale, Illinois			
Send Free Book and full details of E. I. Practical Shop Training.	Ho		
Name			

NVESTIGATE - GET THE FACTS



VOLUME

April, 1937 No. 2

T. O'CONOR SLOANE, Ph.D., Editor
Editorial and General Offices: 461 Eighth Avenue, New York, N. Y.

Extravagant Fiction To-day . . . . . Cold Fact To-morrow

#### Waves

#### By T. O'CONOR SLOANE, Ph.D.

AN has long been interested, even to the point of excitement, in the traversing of space, in making records of one kind or another. In this country the time required to run a hundred yards, on the European continent it is a hundred meters, is carefully recorded. At the other extreme we have the six day course of one hundred and forty two hours, which excited great interest at one time, when crowds were attracted to watch a solitary walker making his weary rounds to see what distance he could cover in the time. Competitors are sent to Europe to compete with the best in the world for the rather uninteresting attempt to see how near the runners can come to "beating the record," What is called the world's record is in the neighborhood of twenty miles an hour, with specially prepared track and spiked shoes. And all the while we are on a sphere that does its

nearly six hundred million miles through space in each year.

The many records made by man fade into nothing compared to this. Man's greatest achievement in the realm of space-traversing is made by the airplane. Due to its rotation on its axis, the earth carries a man the distance from New York to Chicago in about an hour. An airplane requires some two hours to travel that distance It may be taken as about seven hundred miles. If we want to see what our earth is doing in its rotation we must go to the equator, and there it will take us along at about a thousand miles an hour If we want to rest for a while we can go to the pole and as far as the earth's rotation is concerned we will not be moving at all, but the earth is going around the sun at the rate of about five hundred and eighty million miles a year. This is over sixty thousand miles an hour, more than sixty

13

times the distance from New York to Chicago. And at the pole we would be taken along at about that speed. And we read our newspaper by means of light which would go from the sun to the earth in less than nine minutes, traversing space at the rate of one hundred and eighty six thousand miles in each second.

How does a hundred yards run in even time, ten seconds, compare with this?

Then there is the independent drift of the earth through space, its whole planetary system going with it, giving a third motion to be added to what we have noted. And this little globe of ours carries with it on its travels its comparatively thin blanket of atmosphere, composed of various layers, which play a part in making radio transmission around its surface posible. If there were no atmosphere a radio message would go out into space, its nearest adherence to the earth being a tangent to its surface contour.

Very few people stop to think what wonderful travellers we are.

We may ask ourselves what is the fastest thing of all that move in the world? The answer would seem to be light. It is transmitted through space at approximately 186,000 miles per second. As far as we know nothing moves faster, and not only that; but the theory is that the rate just given cannot be exceeded by anything in the universe. It is taken as the limit of velocity. The theory is that nothing can ever exceed the speed of light.

So at last we have a speed to be attained by some of mankind's achievements. To complete his triumphs he should develop the speed of light. This speed he has developed in radio transmission.

This speed is inconceivably great. If the earth moved at that rate in its

path around the sun, the year could be measured most conveniently in secands or minutes. And what about centrifugal force? The attraction of gravitation would have to be increased to another inconceivable amount to keep the earth in its orbit. Yet when we send a wireless message and find it carries its stary with the speed of light. we can feel that in one thing we can go no farther or rather no faster. But when one speaks of the velocity of light, what does that mean? It simply calls upon an assumption, as it seems perfectly just to call it, of the existence of the luminiferous ether, Light is assumed to be due to the waves of the ether. The sun is supposed to throw it into vibration which affects the optic nerve and which we call light. But the sun does not spout out fountains of ether. The ether is there and what the sun does is to throw it into vibration, and fill the ether with waves. It is these waves which travel through space with the definite speed of 186 .-000 miles per second, which affect the eve and enable us to see. The same production of ether waves is done by any luminary, a candle or an electric lamp.

Three kinds of waves may be taken as those we are most familiar with. Waves in water, such as those of the sea, are the only visible ones of the three. Then we come to waves in air. With all its many disturbances sound waves in the air are analogous to ether waves. They are so much slower that, as the colloquialism has it, there is no comparison between them. Sound waves travel at about one thousand feet a second in air. They are invisible. Then we come to the ether waves, also invisible, but which are the producers of light.

The waves in water do not progress, that is to say they do not carry or transport the water of which they are composed. The water at the top of the wave goes forward to a limited extent and as this is what we see, the impression is that the wave is travelling. But what occurs is that the water, at the crest of the wave is carried forward. but at once flows downward along the front of the wave and after it has cone a short distance it ceases to trayel forward, begins when down in the depths of the water to recede so that the wave has in a general way the same shape or contour under the water that it has at the surface. The water then rises on the other face of the wave. Thus it will be seen that the water goes up and down, and forward and backward, in a sort of a circuit, any drift or current it may have being due to the wind or other cause. but not to the wave-action. Thus the waves travel but the water as a body does not.

If a long tube is suspended or rather floated in a vertical position in water with waves, the tube being open top and bottom, it will, as it rises, draw in air and expel air as it descends. The wave action makes it into a sort of air-pump. The air entering and then expelled can be made to blow a whistle. Buoys of this type are used to warn vessels from shoals.

This, in a somewhat crude way, describes wave action in general. But when a wave reaches shallow water it begins to travel. The lower portion is held back by the bottom, and the crest travels on, and dashes up on the shore. This action is sometimes taken advantage of by swimmers who floating on a board are carried in at quite high speed to the beach.

A piece of cord, as thick as a lead pencil or better a little heavier, can be thrown into waves. One end is tied to some fixed support. The other end is held in the hand and a perfect series of waves can be produced with a little practice. It will be seen that they travel along the cord but the cord is stationary as far as longitudinal motion of itself is concerned.

A steam whistle on a locomotive produces a definite note when it is blown. If the engine starts into motion and approaches the observer at high speed the sound of the whistle will rise in pitch. When for an instant even with the observer, he will again receive the natural note but for only the shortest time, and as the engine leaves him the waves will be lengthened and the pitch of the sound will be lowered.

If the ether did nothing more for us than to receive light-waves from the sun, and transmit them to us, we could thank the ether for the work. Here we have stationary waves, waves that imply no continuous motion either backwards or forwards, but which enable us to use the faculty of sight. This is not all that they do. With the application of spectroscopy they enable us to study the composition of the heavenly bodies, and to determine their motions, also by the spectroscope. The element, helium, used in the inflation of balloons and dirigibles, a gas only twice as heavy as hydrogen and non-inflammable, was discovered in the sun by spectroscopy, before it was found on the earth, and we can only hope and wish for a better supply than our petroleum wells give us. All these things have been done by ether waves within the light giving range. But ether-waves may be of any number of lengths. They may be so long that they can be measured by feet or by longer units. Then they may be so short that the angstrom has to be used to express their length.

A millimeter is approximately the

twenty fifth of an inch. After that the measurements of short ether waves are expressed in units based on the millimeter, using successive divisions by one thousand. The mirror is one thousandth of a millimeter, the millimieron is one thousandth of a millimeter, the millimieron is one thousandth of a millimeter, and as if that was not small enough to satisfy most people, we have the angstrom, which is one tenth of a millimieron.

We are very familiar with the ether waves which vary in length from twenty-five kilometers to ten meters for use on the radio. The name of the great scientist. Hertz, is given to the next series of ether waves, extending from ten-meter waves to those of only four millimeters length; they are termed Hertzian waves. Then come the infra red the shortest of which is only seven thousand six hundred angstroms in length. The use of the word "only" is justified by the minuteness of the angstrom, the ten billionth of the millimeter. It is here that ether waves begin to affect the optic nerve: until the ether waves are so short that we can see. And we begin by "seeing red," in the literal sense only. And then our power of vision extends through a range of wave lengths from 7,600 angstroms to 3,900 angstroms. This total range of vision seems quite large, but it is almost minute when we realize how small a unit an angstrom is. Following the scale it gives shorter and shorter waves of the ether. through ultra-violet rays, a certain range of which are germicidal, and a further range of shorter wave injurious to the human eve. Next come the X-rays, which have converted surgery into a certainty of diagnosis and which can be fatal to these exposed to them. and which has several deaths on its record. Gamma rays come next in order of shortness, and finally we come to the cosmic rays, whose length is measured in hundredths of an angstrom.

The waves of ether, radiated from the sun, supply the earth with its heat and light. The waves have a physical effect on the complexion, giving it what is often designated as a coat of tan, and sometimes producing more or less painful effects upon the skin. But we are shielded from most of its possibilities of injuring us by the mantle of air, our atmosphere, which protects us.

The ticking of a watch can be heard through a stick of wood whose end rests upon it while the other end is pressed against the ear. This is due to waves of sound passing through the wood. Ocean soundings are effected by producing a detonation near the surface of the water. This sends sound waves in all directions through the water, and an echo is received from the bottom of the ocean. The time required for the echo to reach the observer gives the data for calculating the depth. This is done by sound-waves.

Any number of examples could be cited of the production and action of waves, from ocean waves, forty feet or more in height to the minute but all penetrating cosmic ether wave. The characteristic feature of all wave action is that there is no transfer of matter beyond the back and forward motion of the substance within which it has its being. Of the various devices now rather prevalent for the improvement of hearing, some appeal to "bonehearing" which depends for the transmission of sound waves through the bones of the head. In ordinary hearing the voice of a speaker or the sound of music, or any or all of the everyday sounds of our experience it is wave action that carries the sound to us. through space by air-waves, but the air is only oscillated it is not moved in volume. While the material of waves is not transferred their effects go through space with various speeds. faster in water than in air as far as sound waves are concerned But when we leave the material things of this earth and work with ether waves, we meet with a radical change or difference

Instead of a rate of travel of wave impulses at a limited rate of speed, we encounter a rate of transmission of wave-effect nearly a million times greater than that of sound-transmission through air. So while a speaker's natural voice would require a seventh of a second to reach a listener about a hundred and fifty feet distant, an ether wave would go around the earth in the same time.

The dimensions of units of practical measurements is a matter of usage or convenience. The scale of ether-waves shows a great change of units of length of waves. The waves used in transmission of radio signals are so long that they are stated in feet or in meters. Ether-waves in a sense follow the curvature of the earth. Otherwise they would go off into space. They do not follow a curve in going across any great distant but are reflected by an atmospheric layer, provided they are not too short. They are constantly reflected back from the atmospheric layers, so that their passage through space around the earth may be pictured as a many pointed star. But if too short then the atmospheric layer will not reflect them and they go out into space away from the earth. Thus if we want to communicate with Mars we would have to use short waves to prevent them being reflected back to 118.

The above implication which some may find in the last two sentences is only used as an illustration of how wireless waves might be lost in space. Of course the suggestion of communicating with Mars by wireless is only figurative.

In these units of measurement there is a source of confusion or error which has to be watched for. The American and French billion is one thousand millions. The English billion is a thousand times greater: it is one million millions.

#### Science Questionnaire

- (See Page 12)
  How does the thin mantle of the earth's atmosphere affect radio transmission? (See Page 12)
  What is the limit of velecity? (See Page 13)
  What is the limit of velecity? (See Page 14)
  On wares transport matter? (See Page 14)
  Give an example of a change of pitch in a sound wave. (See Page 14)
  What element was discovered in the sum before it was discovered on earth? (See Page 14)

- 11. Give a general rang 12. How are ocean sour 13. What effect might
- ot wheel have to make to obtain a peripheral speed of stitute for centrifural force, what would you call it?
- rbon monoxide on the blood? (See Page 105) ng carbon monoxide? (See Page 106)

## Twin Worlds

#### By NEIL R. JONES

These cubical beings have established themselves as favorites with our readers and in this story a decidedly new touch is given to their adventures,

#### CHAPTER I

A COLOSSAL WHEEL

WIFT and silent, like a wandering meteor, the space ship of the Zoromes flitted into the swelling brilliance of what from a distance had been a glowing point against a jet background of vast, illimitable space, only a star among myriads of stars, but now, on closer proximity, a gigantic sun, a perpetual furnace of the cosmo

Thirty-nine machine men gazed in eager anticipation as the various planets were picked out and classified. Delicate instruments supplemented the mechanical eyesight of the Zoromes.

"There are four planets," Professor Jameson summarized after careful examinations had been made. "Two of them on the opposite side of the sun, one at right angles to our approach and another we will soon pass."

The worlds on the other side of the sun, two in number, glowed as small, fixed orbs of light, duller and less scintillating than the fiery stars in the vastness beyond. One planet directly at opposition with the space ship's approach, appeared like a tiny full moon, while a companion world, farther removed from the sun, appeared through the telescopes as a

gibbous orb. The world at right angles was visible as a quarter sphere without the aid of magnifying instruments.

The world they were soon to pass lay directly ahead of them and was not visible due to the fact that the side they were approaching was the night side.

"One thing seems certain," was 744U-21's opinion. "The world which we are soon to reach will be possessed of no atmosphere. Had it air, we should be able to see it even though we are coming towards its dark side. Suffusion of sunlight through the atmosphere often produces a circle of hazv light."

20R-654 turned the course of the cosmic traveller to one side as they came within a quarter million miles of the nearest planet. Like a great arched silver light, the horned crescent of the visible world loomed large. Closely, the machine men examined what they could see of its surface.

"There is no air," said 12W-62. "It is unlikely that the planet supports life."

"Its surface is a vast, frozen des-

"The world rotates."

More of the huge planet became visible as the space ship passed to one side. One quarter of the entire surface now lay open to the examination of the machine men. They discovered from afar only a dead, barren span of desolation and apparent uninhabitation.

"21MM392!"

The professor turned from his position at a telescope as 410-387s thought wave struck him, a thought wave tremulous with rising excitement. The professor believed that 41C-98 had possibly picked out some startling detail of the world they were passing, a detail which had so far escaped the examination of the others. To his surprise, he found that the machine man was not even looking at the world they were passing. He was staring off in another direction without the aid of a telescope. His mind vibrated to discovery.

"There are five worlds, 21MM-392,

not four!" he exclaimed.

"Is there one farther out in space that we missed?" the professor queried.

"No! There is a world between the two we saw the other side of the solar body! The nearer of the two eclipsed the one we failed to see!"

"A remarkable coincidence," the professor observed.

All the machine men now stared across space at a new planet seemingly not far removed from the nearer of the two worlds they had previously seen.

"The central one of the three planets must be very large," said 119M-5, "for from this distance it appears nearly as large as the other one which is much closer."

Glasses were levelled in the direction of the newly discovered world. The planet behind them, growing from gibbous to full, was nearly forgotten.

"That world is not far removed from the other, 119M-5," 29G-75 stated from his position at a telescope.
"They are very close."
"Does it possess an orbit of its

own around the sun?" queried 744U-21.

For a short time, the machine men observed the new world carefully.

"It seems to revolve about the other world."

"A moon, a very large moon," 6W-438 observed.

"Nearly as large as the planet itself."

"I believe you will find on further examination that the two bodies revolve about each other on a common orbit about the sun," the professor stated. "They are undoubtedly twin worlds. One is as much a moon to its companion as it is vice versa.

"They are third in line from the sun. There is but one outer world

beyond their orbit."

The professor now took the glass. Carefully, he estimated the distance between the two worlds as not much more than a hundred thousand miles, while their respective diameters he figured were five thousand miles and five thousand, five hundred miles.

"One of them is inhabited, I believe!" 744U-21 exclaimed. "I can see what appears to be a city on the smaller world!"

"Are there many of such?"

"It is rather hard to tell."

The space ship came closer to the objects of the machine men's scrutiny. At the professor's suggestion, the ship was driven between the twin worlds, giving the machine men a closer view of both planets. From a distance of fifty thousand miles, they examined both worlds.

"I am sure of the city I saw on the smaller world," said 744U-21, "yet now that I look at the same spot where it should be, according to the speed of rotation, I can find nothing but a vast expanse of water."

"It is strange," 6W-438 agreed.
"The same thing happened with me in the case of an island I was viewing."

"Both worlds possess an abundant atmosphere, yet the smaller one seems to be all water."

"Not like the hydrosphere?" 9ZQ-435 interposed.

"This cannot be entirely a world of water," observed 57L-426, who had heard of the adventures of the previous expedition, "for we had already seen land surfaces upon it."

"Yet where is the large island on which I saw the city?" queried 744U-21.

"There must have been some mistake in the estimation of distances and rotation," the professor offered.

"Wait!" cried 29G-75 in rising spirits. "A huge continent on the larger world is coming into view!"

From the watery wastes of the smaller world, the instruments of the Zoromes were now levelled at its slightly larger contemporary, Slowly, a great continent, dark and rugged in its shadows, bright and dazzling where the sun struck, swung into sight. The space ship clung to a restricted area between the two worlds as the machine men took their observations and gathered data, Fully forty degrees of the planet's equator were visible from where the machine men had halted their space ship, both worlds appearing as quarter-moons. Because of atmospheric aberration, poor seeing was prevalent upon the horizons.

If the machine men were excited merely by the appearances of several inhabited islands on the smaller world, what they saw on this larger planet dwarfed into insignificance what they had seen upon its twin sphere. Large cities showed plainly, yet the space ship lay too far distant for the machine men to pick out the inhabitants.

"If the original builders inhabit those cities, they must be possessed of an advanced intelligence," the professor stated.

"Shall we land?" asked 20R-654.

A short consultation decided the is-

A short consultation decided the issue. They circled both worlds several times, examining all sections before choosing a spot upon which to land.

The decision was finally reached to land upon the smaller world, on one of the many islands which dotted the continuous ocean.

A peculiarity of the smaller, waterbound world attracted them. On the isolated islands were small clusters of strange buildings not unlike those on the other world. A careful examination of the other planet had disclosed no space ships, although in their observations, strange vehicles had been found for use on the sea, on the land and in the air. There appeared to be no space ships, yet the scattered dwellings on the smaller world bore a distinct, architectural relationship to those on the larger swhere.

Strangest of all was the solution to 744U-21's enigma. With one of the telescopes, he had sighted an island on which was built a small city. Later, on closer approach of the space ship between the two spheres, he fully believed that what he had previously glimpsed was but a mirage. For where the island and its buildings had previously been, there only tossed a rest-less expanse of unbroken water. 2TE-24 had suggested the coincidence of a subterranean settling of the planet

at that particular place and time. But such coincidences are to be proved before being accepted.

The coincidence was disproved. The disappearance of the island was caused by the heavy, sweeping tides over the lower land surfaces as the planet swung towards its neighboring world. These tides were very high, swelling to meet the attraction of the great globe rolling through space a hundred thousand miles distant. Only the higher portions of the various islands escaped this daily inundation

"But how could anyone live in the city we saw buried beneath the waves?" gueried 12W-62.

"There are several explanations which might serve," 41C-98 offered. "The inhabitants may be amphibious, possessing the adaptation for living in submersion for a passing period of time. Then, too, the buildings we saw engulfed by the rising tides may be on abandoned islands that have sunk beneath the flow tide level."

The machine men nicked out one of the islands on that side of the planet away from the other world. They had a half day in which to explore before that hemisphere swung about to face the companion world. Tides would then flood to the high water mark. Preliminary investigation had proved that this island was among those not entirely submerged at high tide. It was long, rising high at one end and sloping gradually into the sea at the other end. Fully half the island or more lay revealed at high tide. Buildings clustered and dotted the perpetually dry section of the island, while at the opposite end of the island only one building kept solitary vigil. Of all the buildings on the island, however, it was by far the largest. It was built much like a castle, yet without the turrets, towers and other straggling features characteristic of the castles the professor had known. This great building was built massive and compact.

It was at this lower end of the island that the machine men of Zor first decided to land. Coming down, they skimmed but a few miles above the more thickly settled portion of the island's highland. At the glasses, machine men uttered mental exclamations.

"There is life of some sort existent down there! Creatures move about among the buildings!"

"They possess vehicles of a sort, too!"

"What can that great wheel be for?" 744U-21 mused. "It is larger than the buildings around it."

Professor Jameson directed his glass in the direction of a gigantic wheel mounted upright among the squat dwellings below them. At first, it appeared to be resting on the ground, yet closer inspection revealed the fact that it hung suspended on standards, its circumference well clear of the ground. Small buildings lay clustered below it, while various apparatus surrounded the spoked giant with its narrow rinks narrow rinks narrow rinks and the spoked giant with its narrow rinks na rinks

"They must be industrialists who worship the wheel as a means of utilizing power," 41C-98 ventured. "It may be an idol of theirs,"

"Industrialists are generally of a different psychological composite," the professor stated. "That big wheel serves a purpose, perhaps of pumping something from the ground."

"Certainly not water," 12W-62 reflected. "They have all of that they want."

"Unless they pump fresh water," 119M-5 added,

"There seem to be no walls or

dikes erected, so it cannot be used to keep a part of the island dry during the period of submersion."

"This part of the island is not submerged," 119M-5 reminded 41C-98. "We shall find out more about that

wheel after we have investigated the lone castle to see what kind of life, if any, it harbors," the professor promised.

THE space ship of Zor landed not far from the massive pile which possessed but very few apertures, and these appeared to be set with either transparent or translucent barriers of some substance vet indeterminable. Also, these windows were all located far above the ground level of the castle which latter was built of dark gray rock, sombre and discolored through the endless action of the tides. To all outward appearances, the place was untenanted. Discussing the huge, silent structure and its possible hidden mysteries, the machine men approached it, as with metal feet they trod over damp mossy ground where here and there the last tide had left a puddle of water.

"Who are you things of metal who think and talk silently among yourselves?"

Crisp and clear came this mental utterance, halting the advance of the machine men as they stopped in momentary stupefaction. Someone other than themselves had spoken, presumably from the confines of the dark stone building. It was tenanted, evidently, and the machine men were being watched closely.

"Speak to me, that I may understand," came the telepathic voice.
"My mental faculties are not up to your standard. Where are you from? Are you robots from Dlasitap under remote control?" "We are machine men from a far off world of another planetary system," 744U-21 replied. "Our brains are organic, such as yours is probably, too. Our bodies and appendages are mechanical."

"We come with friendly intentions," Professor Jameson added. "Will you not come out? We stopped here out of curiosity."

"Space travelers!" exclaimed the hidden speaker in unconcealed respect and admiration. "You have completely mastered the art of space travel, then! How wonderful!"

There came a pause. The machine men waited patiently for the owner of the voice to appear. Finally, the telepathic conversation was resumed. The speaker, however, still remained invisible.

"I am coming to you. It is not easy to leave this place after it is sealed against submersion. We have already opened and closed it for our daily air supply. Do you understand me clearly? I can understand you quite easily, now that your thoughts are directed to me."

"Your building is waterproof?" queried 6W-438.

"Yes. It is quite necessary if one is to remain here. You may have guessed as much before you landed here"

As the machine men watched, they saw a portion of wall rise from within an indentation of the building, twenty feet or more below the ground level. A long ramp was thrust slowly out and downward, as if operated mechanically. Upon this slow moving ramp stood the castle's tenant whom they had heard and now saw.

The machine men of Zor stared curiously at the diminutive figure on the ramp, the outer end of which softly touched the ground and came to

rost The intelligent creature was little more than half as high as the machine men and nossessed a small globular body mounted on four appendegree An alongsted head rose from the body, a single eye, large and round, staring inquisitively at the machine men from the center of the long head. The machine men believed the creature to be negregard of the upper appendages, and they wondered at this until they saw one of the lower limbs drawn up suddenly to shield the single eve from sun glare as the castle's inhabitant walked out on the ramp from the depth of shadow cast by the huge nile. The four appendages served a double purnose and could be used for handling objects possessed as they were of four digits each

They could discern no means of respiration or the means of induction for food sustenance, but as the creaturne turned a bit one of their previous observations taken for granted was quickly exploded. There were two of the large eyes. They were situated exactly opposite each other, an eye on each side of the head. Another important feature became apparent. There was no front or back to the creature; it progressed equally as well in either of two directions.

"What do you live upon?" the professor asked. "How do you breathe?"

"I eat—that is how I live," came the reply to the impulsive question. "Oh—you probably do not see my mouth, and that is why you are left wondering."

Reaching the end of the ramp and stepping off upon the sodden ground, the strange creature bent his body, or rather, bent two of his legs at their joints, so that the machine men could view the top of his head. An aperture opened and closed several times at

"There is my mouth," he exclaimed.
"I inhale and exhale the necessary at-

He designated ventricles scarcely noticeable at the junction of his head and body. There were several of these.

"I am Kamunioleten."

From the top of his head came the vocal utterance of the name he could not pronounce mentally. The only thought impression the machine men gained of his name were several strange symbols of which they possessed no knowledge and had no key to the relationship of sound thereto.

#### CHAPTER II

#### THE EXILE

"HY do you live on this lower portion of the island which is daily submerged by the tides?" Professor Jameson asked, "Why not live on the higher ground?"

"I live here because I have been made to live here," Kamunioleten replied. "I am an exile, an exiled Administrator of Dlasitap, the world which causes the great tides here on Selimenire."

"Then you have space ships!"
744U-21 exclaimed.

"No—not space ships like yours," Kamunioleten corrected. "The vehicles in which we cross space are not under their own motive power. They are projectiles. They are hurled across space from one world to another—though as yet we have never reached any of the other planets. The other worlds are much too far and our effects too crude compared with yours.

and until we can construct space ships which travel under their own power and can be handled skillfully, we must forego such ambitions."

"How are your projectiles hurled off into space from one world to the other?" 6W-438 queried. "Do you use

cannons?"

"No. We employ the expedient of centrifugal force coupled with a diminution of gravity at the point where one world faces the other," was the explanation. "During your examination of Dlasitap, did you see any of the large wheels which tower as large as many of the buildings"

"We came not that close to Dlasitap, but we saw a large wheel on the higher end of this island and wondered at it." 41C-98 replied.

"What supplies your motive power for the revolution of the wheel?" the professor inquired.

"We heat water in a huge, enclosed container," Kamunioleten explained. "The water turns to hot vapor which expands, and we utilize this expansion as our power."

"Steam!" Professor Jameson exclaimed. "You use steam power!"

"Crude," yet nevertheless ingenious." 744U-21 remarked.

"Your wheels must certainly be strong or else they would fly apart from the rapid speed at which they must be driven."

"Not so rapid as you might possibly think," said their informant, "though it is true that such catastrophes have occurred before now, especially in the earlier days of travel between the twin worlds. That, however, is but one of the many hazards."

"We can gather, then," said the professor, "that the far reaching gravitational power of one world nullifies to a marked degree the gravity of the other world at the position of highest tide and makes for less required inertia of centrifugal force."

"I could have explained it to you no better myself," Kamunioleten commented admiringly.

"What keeps your ships, or cosmic projectiles, from crashing?" 744U-21 asked.

The wheel is slowly accelerated to a speed which will throw the projectile just beyond the attraction of the planet from which it is being thrown and into the pull of the other world. For deceleration, we possess atmospheric contrivances which remain folded into the rear of our projectiles while they are being shot into space. When they reach the atmosphere of the opposite world, the contrivances are gradually released so that the deceleration does not occur too quickly."

Kamunioleten went into a description of stabilizer fins, and then he told them of a broad disc of metal. which, using the projectile as an axis, spread fanwise about it in ever increasing diameter, acting as an air brake. Last of all, he told of light, metal parachutes folded into the projectiles and released as soon as the air brakes had taken effect. Always aimed at an oceanic body, the projectile released the parachute just before striking the water, allowing the projectile to dive deeply into the fluid, losing its momentum, and then coming to the top.

"The parachute contrivances are recovered from the surface of the water, for they are built of segments of hollow metal. We always dive into the sea. A careless aim, or ill timing, may mean a descent on land, a catastrophe which always spells death and destruction."

"And so, in your floating projectile, you wait until a boat comes, or else you drift in to land," 12W-62 suggested.

"That is the easiest part of all,"
Kamunioleten told the machine men.
"The projectiles possess motive power to drive them through the water."
"Steam is again employed. I sun-

"Steam is again employed pose," 29G-75 ventured.

"It also heats our projectiles during the great coldness which comes between worlds," Kamunioleten stated, "Insulation and triple partitions help a lot, too."

"It must be a great adventure," Professor Jameson mused. "Do these ships of yours cross space very often?"

"Not so often," Kamunioleten told them. "There are too many hazards. as you can well appreciate. Wheels have broken under the terrific strain to which they are subjected, projectiles have been released prematurely. or accidentally, flying off into space on an endless journey or smashing into the ground, either of which is fatal. Then, overspeed or else insufficient acceleration have caused tragedy through miscalculation. Projectiles have missed their mark, or not having been given enough push have fallen back upon the planet they were to have left. In the latter case, especially with projectiles leaving this world, passengers have been saved through the good fortune of the projectile's having landed in deep water."

"It is a wonder that anyone dares to travel that way," marvelled 19K-59

66 THAT is but the beginning," continued Kamunioleten, dwelling pessimistically upon his morbid subject. "Projectiles improperly aimed often fall upon land surfaces of the opposite world, more likely if traveling from Selimemigre to Diasi-

tap which is the mother world, the home world, the original birthplace of our race. This means a smash; a smash means death and junk. There are also hazards in space, in the air and on the sea. If no part of the projectile is ruptured in its flight through the atmosphere, thus letting heat and air leak out into space, is not struck by a chance meleor, its deceleration contrivances may become iammed and unmandscable.

"Projectiles that have survived the trip across space and hit the water have been known to sink, too, through too great a water pressure from its dive into the sea. This fault is largely due to insufficient deceleration or else a failure of the parachute to become unattached before the projectile hits the water, or the projectile may not hit the water straight through clumsy or belated release of the parachute."

As Kamunioleten enumerated the various hazards connected with this primitive mode of cosmic travel, the machine men saw that he was exaggerating the possibilities of mishap to the projectiles. They also saw that the cause for this lay in a melancholy outlook, a brooding fatalism which held sway over the mind of this intelligent creature. He was depressed, and his weighted spirit sought expression and release in this gloomy retrospect of snace travel.

A leading comment by 6W-438 probed the cause of this dissatisfaction which had evidenced itself in Kamunioleten's pessimistic attitude.

"You spoke of being an exile."

"Yes. I am the deposed Grand Administrator of Dlasitap, kept here as a pawn in the hands of my evil successors. They are tricky and cunning; enough so to have put me out of control and to keep me exiled here. The twin worlds have rotated about the sun more than seven times since I first came here."

"Why do they keep you exiled instead of killing you?" asked 744U-21. "The latter way would seem much easier for them."

"They dare not kill me, for then the nations of Diasitap would rise up against them, and against each other, and their false story might be proved untrue in the event of such a grave situation. Proof of my continued existence is their safety."

"But why do they keep you here at this lower end of the island?"

"They intend to keep me out of contact with the colonists to this world. They fear that someone may believe my story and that its credence will spread to Diasitap and prove their undoing.

"Can you not journey to the higher end of the island during low tide?"

Professor Jameson inquired. "Or are you under guard here?"

"I am the master here," Kamunioleten replied. "I have three Vosquenteb servants here, a lower race whom we found as the original inhabitants of Selimemigre. Otherwise, I am alone. As for journeying to the island's higher end during low tide, it is much too far to be made on foot before the next high tide. My enemies have planned well."

"How were you overthrown?"
744U-21 queried. "You spoke of trickery."

"It might be well for me to first explain our governmental system on Dlasitap," said Kamunioleten, seating himself upon the ramp, his four legs spread equidistant like spokes of a wheel. "I have hopes that you may be able to help me, if you will. This idea occurred to me rather quickly right, after you landed, probably because I am slways looking to the day when a

discovery will take place on Dlasitap, when the undercurrent of evil in the present rule of government will be uncovered, as it seems to me that sooner or later it must be. Then, I feel, I shall be brought out of exile by the public masses."

HAT happened?" 6W-438 probed the mind of the exiled Administrator for the crux of the problem.

"There are seven nations on Dlasitap," Kamunioleten explained, "and each nation sends a group of officers to the Grand Assembly, the governing body of Dlasitap. Long ago, it was found that nations could not rule themselves individually and still retain amicable relationships. Of this governing body, there is an Administrator for each nation, standing at the head of each nation's group of officials in the Assembly. Chosen by popular vote of the Grand Assembly, one of the Administrators is elected Grand Administrator."

"And you were the Grand Administrator, I take it," Professor Jameson interjected.

"I was," Kamunioleten related.
"But there were lesser members of
the Assembly who sought my power
and the power of the other Administrators of whom there were six besides myself. Their aims, though appearing to the general public as satisfactory, were inwardly selfish, and
they were encouraged by monopolists
who secretly backed them. But the
people were satisfied with us, and as
our terms are indefinitely long, these
malcontents, under the leadership of
Bemencanla, awaited a chance to
strike.

"We Administrators were not suspecting any such active, violent move as was made by Bemencanla and his

followers. There comes the annual trip to Selimeniere, when at least five of the Administrators must make a tour of the colonies here to be assured that they are being properly governed and that the natives, the Vosquentebs, are being fairly treated. As you have gathered. I am rather reluctant about travelling in the stellar projectiles which seem so hazardous and unsafe, and as there were five others of the Administrators either eager for the trip to Selimemigre as a well earned vacation, or else willing and indifferent, I did not go. Neither did Owmitelyerol who is old and not well.

"The five Administrators chose one of the smaller projectiles with a crew of three besides themselves, and the projectile was placed on one of the power wheels. On the day that they left, it was a shocking story that reached me, and it left me both hor-rified and bewildered, for at that time I was unable to piece together the schemings and perfidy of Bemen-canla all at once. The bombshell struck and left me stunned until after I had been whisked away to this island on Schimemirer.

"The projectile with its eight occupants, five of them Administrators of the Grand Assembly, had been released at the wrong time, or I should say, at the wrong position of the wheel, being shot into space at a tangent direction from that of Selimemigre. Our scientists say that such ill-aimed projectiles will keep on through space forever, unless they fall into the attraction of another celestial body. They lived, no doubt, until their food or fuel gave out."

Kamunioleten paused in moody contemplation, 744U-21 urged him on with his story.

"And in some way you were ac-

cused of having planned the accident?"

"Exactly. It seems that, unkown to me, a group of my countrymen were in charge of the wheel and apparatus which sent the ill-fated projectile off upon its endless journey. and this was strange, for it was in a country other than my own where the projectile left Dlasitap. Afterwards, none of the operators of the wheel could be found. In fact, for some time here in exile I believed they would be found and my innocence established. But they were never found, and I gradually came to understand that this was but more of Bemencanla's scheming. He had somehow bribed these countrymen of mine to attend the wheel and send the projectile off in an undestined direction. Their escape and disappearance was planned, and I would not be too sure but what Bemencanla saw that death overtook them, so that they might not live to tell."

"What motive could be fastened upon you as the instigator of the deed?" the professor asked.

"Bemencanla possessed a ready weapon. Others of the Administrators had opposed a measure of mine recently, and although it was not overly important, this event magnified its nurport. In my exile, I am rarely visited, and even then Bemencanla, who is now elected Grand Administrator, sees that only his own minions are allowed to visit me. I hear but little of what goes on upon Dlasitap. All I ever see of my own world is before and after high tide when it is distinguishable as a great globe lying upon the horizon, for as it commences to rise in the sky, the waters pour over my castle, and Dlasitan disappears as a blur in the green depth above me."

"And what of this Owmitelverol?" Professor Jameson asked. "What did this surviving Administrator think of the affair? Did he condemn you, too?"

"I do not know," Kamunioleten confessed. "I was removed here to Selimemigre too swiftly. I was quite sick on this first trip of mine across space, for despite the devices employed to lessen the centrifugal force on our bodies while our projectile is being revolved, I felt myself flattened and thought that I would not survive the ordeal. I lost my senses momentarily as most of us do on the start of such trips."

"It will not be long before the great tides sweep over your castle," Professor Jameson reminded Kamunioleten. "Dlasitap is rising upon the horizon."

It was true. Shining pale and gibbous in the sunlight, the twin world was slowly rising into the sky. Its ascension heralded the rising tides.

"Come into the castle—all of you," invited Kamunioleten. "There is plenty of room indeed for you all. I have but three of the Vosquentebs here. You will find them a stupid lot, but they are nevertheless faithful."

"We shall be glad to come in and talk more with you, Kamunioleten, for your story interests us," said 744U-21, "but as for your fears of our survival against the rising tides, let me put you at rest. We are as much at home in the water as in the atmosphere, though it is true that movement in the water is slower, and currents of water are stronger upon us than are currents of air."

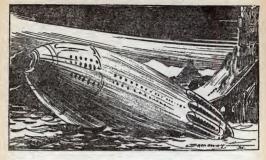
"You are marvellous creatures," was Kamunioleten's admiring observation, "and I am truly thankful that of all systems in this vast universe you should pick this one to investigate at this particular time."

"It is more of a coincidence that he should have picked this one spot on Selimemigre on which to land," 6W-488 made mention, "though it is obvious that once in this system of worlds our attention would immediately be attracted by the twin worlds."

The machine men filed into the castle over the long ramp, leaving six of the Zoromes to man the space ship. 20R-654 had orders to float upon the surface of the ocean in the castle's vicinity until the tide should have gone down.

"Come to the top of the castle," offered the exile, as the last of the machine men stepped off the ramp. "From the topmost roof we shall see Dlasitap rise and pull the waters of Selimemigre so high that we shall no longer be able to see Dlasitap."

Kamunioleten led the way to a broad, spiralled stairway which funneled its way to the topmost ramparts. And what a queer stairway the machine men found it to be. The professor had never seen its like before. All the stairways he had seen on the planet earth had been a rising succession of steps. On Zor and its sister worlds, there had been no stairways. Sloping ways led from one level to another, much like the ramp on which they had walked into the castle, while the higher levels were always reached by mechanical means. This stairway, however, represented a seemingly haphazard, upward succession of blocks. Kamunioleten hopped up them nimbly, while the machine men picked their way carefully, lest they stumble along this unfamiliar path. It was a strange stairway, but a stairway to fit the mobile



The water level rose rapidly now, the space ship awash and bobbing about like a cork.

appendages of one like Kamunioleten to perfection.

On the way to the roof where Kamunicleten wished them to watch the inundation of the castle, they passed three or four levels. On one of these near the spiral stairway, they suddenly caught sight of one of the Vosquentebs. It was a slender creature standing, like Kamunioleten, on four legs, yet its body was long and slender, and its head was not so high nor as prominent a feature. The eves were situated lower on the head, and, instead of being placed opposite each other, they were closer together. The mouth, though situated above the eves, was not on top of the head, as in the case of Dlasitap's inhabitants. The professor discovered in the Vosquentebs only a remote resemblance to their conquerors from the other world. Somewhere, in the remote past ages, there must have been some connection between the two species, for their body structures were not greatly dissimilar. An unintelligible talk was carried on between Kamunioleten and the Vosquenteb, the machine men sensing instructions given by the exile to the others

#### CHAPTER III

#### THE LOST PROJECTILE

In the exchange of enunciated syllables, the machine men observed that the Vosquenteb referred to the race of creatures from Diasitap as Emites. Their syllables, coordinated with the accompanying thought impressions, referred to Kamunioleten in terms similar to "great Emite," and in the minds of the Vosquentebs, as they later discovered, all of Kamunioleten's species were classified as Emites.

The machine men, led by Kamunioleten, passed on upward to a flat roof of thin, stone slabs carefully cemented. Yet, when queried by the professor, Kamunioleten disproved the assumed supposition that the stonework was waterproof. The waterproofing was done on the inside, rather an intermediary layer of building material between the inner and outer walls.

When Zoromes and their host reached the square platform of the highest roof, they fairly crowded it. Dlasitap, now well above the horizon, climbed slowly towards its zenith, or, more correctly, the zenith of its rise represented by the island's position on the surface of Selimemigre.

Kamunioleten pointed afar. "Look," he said. "The tides are coming."



"We must go below at once!" he urged them.



The machine men and Kamunioleten hurried into the little super-structure and down into the castle, two of the Vosquentebs closing the watertight door behind them.

And the tides were coming. Undulating waves rushed forward in the distance as upon a beach, vet they did not recede, the water level creeping ever nearer until the waves washed the base of the castle, swirling curiously about the space ship of the Zoromes. More waves washed lazily about the castle, accompanied by a perceptible rise of the water level, as if subterranean aqueducts were quietly pouring their contents into the swelling ocean. As Dlasitap crept higher in the sky, the water came ever higher as if to meet it. which in itself was an actual truth. "The highest tides are those with the sun behind Dlasitap," said Kamunioleten, "yet this tide will inundate the castle completely, for it is always so."

The water level rose rapidly now. the space ship awash and bobbing about like a cork. The boundary where the gradually receding beach met the lapping waves hurried away in the direction of the distant highlands. Like a sinking ship, the castle floundered deeper in water until the illusion would seem almost true were it not for the stabilizing sight of a hazy horizon of substantial ground. The water crept to the edge of the roof on which the Emite and the machine men stood. Kamunioleten looked longingly upon his home world rising in the sky above the far horizon formed by distant hills, but he roused himself suddenly.

"We must go below at once!" he urged them. "The castle will soon be completely submerged!"

On all sides, the rising ocean lapped the castle walls, while a little to one side towered the space ship of Zor. floating and bobbing upon the watery expanse. The mellow glow of Dlasitap's gibbous face vielded to one of more intense brightness as it rose higher in the sky. The machine men and Kamunioleten hurried into the little superstructure and down into the castle, two of the Vosquentebs closing the watertight door behind them. This was scarcely accomplished when a gentle ripple of water crept over the roof they had just quitted.

The professor, 744U-21 and Kamunioleten returned to the interior of the superstructure at the latter's suggestion and gazed through the thick, transparent windows. Waves swirled above the eastle making the

bright, gibbous face of Dlasitap seem indistinct and distorted, the twin world apparently dancing crazily about and changing its shape in quivering, shimmering movements. Blue sky yielded to gray translucence as Dlasitap became vague through the watery expanse overhead, gray deepening to dull green which grew steadily darker. The roving hemisphere of night was commencing to creep over that section of Selimemigre.

Kamunioleten gave what was equivalent to a sign as the rising orb of Diasitap grew indistinguishable through the surging, overwhelming flood. He led the way down into the castle once more, and behind him walked the two machine men. 744U-21 questioned the Emite concerning the lost ship of the five Administrators and its crew of three.

"And did you ever know what became of the lost projectile?"

"It is still travelling off into space at its initial rate of speed which it possessed when it left the attraction of Dlasitap, doubtless," was Kamunioleten's sad rejoinder, "Besides being aimed wrong, the projectile was given excess speed; otherwise it would have slowed to nearly zero beyond the attraction of Dlasitap. Eight bodies stiff and stark in death -yet maybe they are better off than I am; who knows? Yes, even as over seven years ago, the projectile and . its passengers are still travelling through the endless space, headed for an endless destination."

"Seven years?" 744U-21 echoed in query.

"Seven years," and here Kamunioleten paused in thought. "Seven years and one hundred and six days, to be exact—that is, seven of Dlasitan's years. You see. I have little else to do here in exile other than keeping track of such things, yet they brew morbid thoughts."

"What difference is there in Dlasitap's year from that of Selimemigre's?" Professor Jameson inquired. "It must take both of the twin worlds the same length of time to circumnavigate their common orbit about the sum."

"The difference is this," the Emite explained. "Selimemigre turns faster upon its axis than does Dlasitap. Dlasitap's year of 178 days has fewer days than has the year of the twin world. The day of Dlasitap is divided into eighteen whegs. It takes Selimemigre but eleven and five-sevenths whegs to make a full turn upon its axis; that is, estimated roughly, Of course, Dlasitap being the original home of our race, all calculations are based upon its unit of time."

"Was there any estimate obtained concerning the speed of this lost projectile?" 744U-21 inquired curiously.

"Our astronomers lost sight of it long ago through their strongest glasses, and several years have passed since it dwindled from sight, but, from what word has been given me in my exile, I have learned that a nearly exact estimate of its speed was obtained. The ill-aimed projectile left Dlasitap's gravitational attraction travelling at the rate of 1384 borgs per wheg. There is no reason to believe that during the ensuing years this rate of speed has altered."

"None indeed," 744U-21 agreed.
"Unless a meteor impact should deflect the direction of flight, or change the speed," the professor in-

terpolated.
"Yes, that possibility does exist,"
said Kamunioleten, "though it seems
remote."

A LONG time the Emite and machine men remained in discussion, Kamunioleten sitting down at a broad table through weariness of physical structure from which the machine men were immune. They talked of the lost projectile in space, of space flight between the twin worlds, of Bemencanla's perfidious treachery and of how best the machine men might reinstate Kamunioleten, for they had developed a genuine sympathy for the unfortunate exile.

Among other things, they came to conceive of Kamunioleten's references to time and measurements. Reduced to earthly terms, Professor Jameson learned that a borg measured 7.193 feet and some few inches; also that the day of Dlasitap divided into whegs equalled sixteen hours and forty-eight minutes, not measured to the exact second.

"The projectile travelled about 2,021 of my earthly miles per hour," was the professor's final summation to 744U-21.

When the tides had receded, Kamunioleten once more opened the way leading out upon the roof. He and the machine men walked over the damp rock, where little pools of shallow water dotted the concavities. Both the sun and Dlasitap had gone to rest, the latter recently set, a luminous patch of sky marking its descent into the horizon. Kamunioleten pointed among the twinkling stars to a glimmering point of light near the zenith; then he designated another star barely distinguishable to the naked eve, not far from the first.

"Astronomers of Dlasitap could give you more accurate information of a nature better simplified than my own," he told them, "but exactly forty-seven six-eighths of the distance from that brightest star on a straight line to that faint one is the direction taken by the lost projectile. With the naked eye alone, I am told, it is the best way of computation."

The machine men were fully agreed upon helping Kamunioleten in his misfortunes, and they were anxious to see the near-by world of Dlasitap and its civilization. 744U-21 was for an immediate embarkation with-Kamunioleten in the space ship of the Zoromes to Dlasitap, proclaiming the duplicity of Bemencania and his minions with the return of Kamunioleten to his proper status once more.

At this vision conjured in the forceful mind of the machine man, a glow of enlivened hope shone in the eyes of the Emite, yet his countenance began to be troubled.

"No, that would not be the right way, at least not the best way," he averred. "I not only want to win back my power but the faith of the people as well. Too firmly has my supposed treachery been intrenched in the minds of the peoples of Dlasitap, I may thank Bemencanla for that. I would know what Ownitelyerol thinks, if he lives, as well as my most loyal supporters, not to mention the general populace. I can return better prepared, if I know the situation that exists on Dlasitap and how the people take to the rule of Bemencanla and his officials."

"And you want us first of all to go to Dlasitap and find out these things?" Professor Jameson anticipated for the Emite.

"Yes. Then you can return and tell me, after which we shall know best what to do."

They returned to the ground level.

Once more the tides were receding,
and the space ship of the Zoromes

rested on dry ground close by the castle. One of the Vosquentebs had opened a way to the west ground surrounding the castle, and the machine men were walking about examining various forms of sea life left by the receding waters, many of these aquatic species struggling valiantly to return to the green depths which had so magically rolled away upon the horizon, a horizon which Professor Jameson had observed as less distant than upon worlds the size of, or larger than, his earth.

Near the ground level, the professor and 744U-21 found two of the Vosquentebs balling water from a lower portion of the castle, bringing it up to the ground level in large buckets and pouring it outside where it trickled into rivulets and pools.

"What are they doing?" the professor asked.

ressor asked.
"There is a leak below the ground level of the castle," Kamunioleten explained. "Of late, it has grown worse. Within the past few days, we have found it necessary to empty the lower keep of water. I spoke about this leak the last time I was visited by the supply ship which sails here on the high tide every eleventh day. It will come again soon, and on it I expect suitable repairs for this growing leak."

THE machine men returned to the space ship and held a consultation. It was decided that Kamunio-leten's advice concerning a more complete knowledge of the present situation on Dalasitap should be adopted as a plan of action. Professor Jameson thought it well for a few of the machine men to stay with Kamunioleten until the rest returned, if for no better reason than to keep him company, as well as to

aid the Vosquentebs in keeping the lower regions of the castle dry after high tide. Kamunioleten was delighted to learn of this turn of affairs, especially when he learned that the professor and seven more of the machine men were going to stay at the castle with him while 744U-21 and the rest were crossing space to Dlasitan.

Once more the waters rolled up over the castle, burying it in the green, translucent depths where finny denizens of the deep ogled curiously at the moving forms in the castle seen dimly through stalwart. transparent windows. At low tide. the space ship of Zor rose into the sky and headed for Dlasitap, leaving behind on the island the professor and seven metal companions. Of these, there were 6W-438, one of the professor's closest associates on his cosmic adventures, and 5ZQ-35, once a Triped on the planet of the double sun and known as Glrg, both of them from the old expedition. Then there were 777Y-46, 19K-59, 8L-404, 65G-849 and 948D-21.

Days passed uneventfully. There came always the inevitable tide on its restless journeying, which regularly enveloped the castle as Dlasitap towered above the horizon, going through its various phases in relation to its twin world and the sun. The sun rose and set, and when the sun lay high in the sky with Dlasitap, the tides were higher, as was evidenced by the increased pressure. No better gauge of the pressure was needed than the leak in the cellar of the castle. As Dlasitap reached its zenith, and the waters buried the castle at its deepest, there spurted from the ruptured masonry a strong parabola of water.

As Kamunioleten had said, the

leak was steadily growing worse. The machine men helped the Vosquentebs bail the water out of the lower level of the castle to keep the ground level dry. In fact, had it not been for the machine men, the Vosquentebs would never have bailed out all the water before the next tide rose. But as the professor pointed out, the worst Kamunioleten might expect from the leak would be a flooding of the ground level during high tide, and this might easily be disposed of by opening the sealed doorways and letting it run out at low tide. In that case, it would be necessary to retire to one of the upper floors. Kamunioleten received this reassurance philosophically, vet with an uneasy bit of pessimism.

"So it might be if the leak in the wall grew no worse, yet daily it allows the entrance of more and more water. It is well that I soon expect the supply ship with the necessary repairs."

Professor Jameson mentioned the probabilities of numerous eclipses due to the close position of the twin worlds, to which Kamunioleten made affirmative reply, asserting that the eclipses, though common, were unusually impressive because of the sun being generally hidden entirely from sight, only its strong rays visible in a halo of atmosphere surrounding the opposite world. Eclipses were rarely seen from the castle, he told the machine men, because they usually occurred when Dlasitap was hidden from sight by the towering waters.

The supply ship which the Emite had been expecting came one day. As those upon it were more or less in the employ of Bemencanla, Kamunio-leten thought it better that the machine men remain hidden and see,

in the minds of those who came, as much as it was possible to ascertain. So from their vantage points the machine men saw the great, flat, steamdriven boat settle slowly with the tide and finally come to rest on the island not far from the eastle.

The boat was manned with Vosquentebs as well as Emites. Many of the latter left the boat and came to the castle, Kamunioleten having already let down the long ramp to the main entrance. The Emites entered. and the machine men sensed much conversation between them and Kamunioleten. Later, both Emites and Vosquentebs were busy bearing large boxes and other supplies from the drydocked ship to the castle. Then came the high tide once more, rising slowly at first from out of the distance: then gaining proportions quite rapidly until the supply ship floated far above the sunken castle.

During the interim, the Emites from the boat repaired the break in the cellar of the castle, assuring Kamunioleten that he had nothing more to fear from leakage. On the next low tide, they regained their ship, to lie in wait for the next high tide. When the waters lowered again, with Dlasitap slowly sinking below the distant skyline of water, the boat was gone, nor could it be seen anywheres in the distants the distant shyline of water, the coat was gone, nor could it be seen anywheres in the distance.

All during the stay of the visiting Emites and Vosquentebs, the eight Zoromes had remained in hiding. Now, they came forth once more, finding Kamunioleten eager to discover what, if anything, the machine men with their keen mental faculties had learned from the visitants. Professor Jameson summed up the consensus of the machine men in a declaration of warning.

"Somehow or other, they do not

mean well by you, Kamunioleten. As you yourself have said, Bemencanla would have you killed if he dared, yet for matters of state he must keep you in exile. From our position where we could not observe them, it was a bit more difficult for us to probe their thoughts, especially as they were not directed at us as are your thoughts. Also, their mental designs were a bit garbled and mixed to our susceptibilities. A malign regard is borne you, and these Emites aboard the supply ship are a party to it."

"Which is little more than to be expected," Kamunioleten added, "for Bemencanla would see that no friends or sympathizers of mine were put in contact with me."

"Bemencanla fears you then, in spite of your seemingly impotent position," said 6W-438. "This fear of his is your chief danger, for, if it were possible, he would have you done away with."

#### CHAPTER IV

#### MENACING TIDES

HE next high tide allayed any fears of Kamunioleten that the the old leak would cause further bother, for the Vosquentebs reported that no water had leaked into the castle. Meanwhile, the machine men were expecting the return of the space ship from Dlasitap. Regardless of the fact that 744U-21 had set no specific time for his return, the professor felt that by this time those aboard the space ship must have discovered what information they believed would be valuable to the exile on Selimemirer.

Yet each lowering tide showed no return of the space ship. The machine men commenced to suggest various possibilities.

"Do you imagine that mishap could have overtaken the space ship?" 948D-21 offered.

To this there was no direct reply; only the fearful speculation. Yet it was 6W-438 who spread a bit of optimism upon the subject.

"They may have found something which calls for a longer stay than they had previously anticipated."

"Those aboard the space ship may have forgotten the exact position of this island," was 19K-59's hopeful contribution to the general conjecture.

"We can only wait and be patient," Professor Jameson stated. "I recollect that I had a seven hundred year wait once in a wrecked space ship."

Kamunioleten stared aghast at the professor's matter-of-fact revelation, an episode in the system of the double suns.

"While I waited that long at the bettom of a broad ocean pit," 6W-438 added.

"You had the company of fourteen companions, while I was alone," the professor reminisced.

Kamunioleton was curious and intensely interested in the adventures of the machine men, and while they awaited the return of the space ship they related to the Emite many wonderful things, what they had seen and events which they considered outstanding among their cosmic travels. Kamunioleten listened in awe and rank attention.

During the time Kamunioleten found it necessary to sleep, the eight machine men were left to their own devices. The three Vosquentebs they found to be true representatives of an humble, dull-witted

species, and they afforded the Zoromes little diversity in the performance of their duties. Several times the machine men went on small tours of the surrounding island both at low tide and at high tide. The Emite was greatly astonished to see them moving about under water from his vantage point inside the eastle.

It was during one night at high tide that a startling occurrence broke the monotony of ceaseless waiting. Kamunioleten lay asleep, and the Vosquentebs were either asleep or otherwise occupied in the unper reaches of the castle On all sides and above, the water lay deep and unfathomable to the evesight. Silence had replaced the washing and swishing sounds made by the water rising about the castle, for now the isolated pile lay buried in the green depths of the sea. The eight machine men were gathered on a middle level of the castle in preoccupation and idle conjecture as to what at that moment might be happening to those who had left in the space ship, A gurgling, washing noise of water came to their mechanical senses of hearing.

"What?" exclaimed 8L-404. "Is the tide commencing to drop so soon?"

"It doesn't seem early enough for it," said 777Y-46.

"Nor would I say that it was," 6W-43S observed, peering through a transparent square of the castle's outer wall into the black water. "But it is night outside, and the varying periods and heights of the tide in relation to the positions of Dinaitap and the sun still have me confused."

The faint sound of water persisted. It was not unlike the sound it usually made against the castle when the tides were rising or falling, 65G-849 walked out of the chamber to the stairway which spiraled up through the castle. He looked down; then listened.

"The water we hear is inside, not outside, the castle!" came his electrifying announcement.

"The leak!" 6W-438 exclaimed.
"The water pressure has reopened the breach!"

"Awaken Kamunioleten!" Professor Jameson told them as he and 6W-438 clattered down the eccentrically arranged steps of the spiral stairway.

Now, the noise of bubbling, lapping water grew louder. It was eaused by a formation of the ceiling on the lower floor where air first became trapped and then was forced out again under increased pressure, as more water flooded the gap.

"This is bad!" the professor foreboded. "The leak is much worse than before!"

"We must see if it can be stopped!"
was 6W-438's hurried decision as he
plunged into the rising water which
surged up the stairway.

THE threatening flood enveloped them as they continued on down the submerged stairs and into the cellar level. Darkness, as well as water, buried them in its mysterious folds, so that they had recourse to their body lights. Guided by the subdued beams through the murk of the flooding menace, they groped their way to where not so many tides gone by the visiting Emites had repaired the leak. What they saw put in their minds a common thought. Moreover, they recognized the futility of trying to stem the inrush of waters. It was only a question of time when the flood would prove a grave menace to Kamunioleten and his three Vosquentebs.

The two machine men made their

way back to the stairway where lights other than their own waved at them. 19K-59, 5ZQ35 and 948D-21 had come to meet them. All five machine men hurried up the stairs and out of the rising flood. Professor Jameson noticed that the water had risen alarmingly since he and 6W-438 had descended.

In the minds of both Zoromes lay a common conviction. That reoccurrence of the leak had been of set design rather than accident or care-lessness of the Emites who had supposedly repaired it. The insidious influence and fear of Bemencanla was clearly revealed. This was evidently of his doing. As they rushed into the upper reaches of the castle, the professor told the startled and frightened Kamunioleten as much.

"It is a design on your life and those of your servitors, an arranged accident! The waters are rising fast to drown every breathing creature in the castle!"

"The leak has been enlarged!" cried 6W-438. "We found it packed with material which would wear away slowly through action of the water! To-night it burst!"

The color had drained from the exile's face. The Vosquentebs, aroused and excited, piped in shrill nervousness and terror.

"I had thought myself more secure!" the Emite exclaimed. "Is there no escape?"

"We must climb to the highest position in the castle," was Professor Jameson's advice," and hope that the flood will not reach there before the tide descends."

"We must turn off the air vents which force out old air during high tide!" cried Kamunioleten. "Then the water can only rise to a height where air pressure will be equalized with that of the water pressure!"

Immediately, one of the machine

Immediately, one of the machi men sprang to the task.

"There will be no bad effects to your respiratory system, I hope," 6W-438 reminded the Emite.

"We can change the air when the tide descends."

Higher rose the water in the castle, compressing the air in the upper chambers which remained unflooded. The tide reached its maximum height, leaving only the top floor of the sunken castle unflooded. From then on the water receded as the tide fell and released its tremendous pressure. The professor said nothing to Kamunioleten on the matter, but he feared what the results might entail to the Emite after being subjected to so great an air pressure. Well did he realize how bubbles might be formed in the Emite's blood from too rapid a reduction of atmospheric compression.

The tide dropped slowly, and the compression became less. Finally, the level fell below the apex of the stone structure, and the pressure rapidly reached normal once more. The water flowed out of the castle as it had flowed in, and now an ingress of purified air was allowed.

Misgivings assailed the professor as one of the Vosquentebs crumpled into a heap and rolled in agony on the floor, his limbs bent and constricted.

"He, like you and your other servitors, were released from the air compression too soon," Kamunioleten was told briefly. "You may suffer from it yet."

There seemed little under the circumstances that could be done for the Vosquenteb. They could only wait. In the meantime, Kamunioleten complained of dizziness and sharp pains in his head. He sat down and was seized with a strange, shivering spell.

"It is a common ailment which I recollect in my past life on the planet earth as afflicting deep sea divers who came to the surface too soon and divested themselves of their diving apparatus," the professor related. "Kamunioleten and his servitors have nothing to fear unless their peculiarities of structure differ sufficiently from the human organism I once knew, so that their death from this source may be more easily contracted."

The Emite now complained of excruciating pains, especially in his joints. One Vosquenteb was affected badly, while the other two were afflicted to a lesser degree than their fellow, who rolled on the floor gasping at the sharp pains.

"Is—is it dangerous?" flashed Kamunioleten fearfully. "Is there a chance of death from this?"

"You must leave the castle before the next high tide," the professor told him. "It is probable that you will emerge from this little the worse for wear other than a temporary weakness, but too many repetitions will prove fatal."

EAVE the castle?' the Emite cried in bewilderment.

"Where? Your space ship is absent—and there is nothing here with which to make a raft; thank Bemencania for that! And a raft would be scarcely seaworthy, for at highest tide the waves are generally vicious!"

"We must reach the higher end of

the island," 6W-438 stated.

"The tides will never let us do it,"
Kamunioleten replied wearily as a
sudden wave of sharp pain racked

his body and passed. "The distance is too far to be made between ebb and flow."

"It is your only chance if you would live," said the professor. "I can truthfully tell you that a few more such experiences as this one will be the death of you."

"I can truly believe it!" the Emite exclaimed as he gripped his body at another spasm. "But I can never make it to the other end of the island, even were I feeling in the best of shape, which I am not."

The sorely afflicted Vosquenteb was still lying on the floor but was now more quiet. He groaned occasionally, but it was evident that the more evil effects of the too rapid decompression were wearing off. His companions, too, were a sickly pair, but not as bad as he, for they had not labored during the compression so intensively.

"The time to act is soon," the professor warned the Emite. "The waters are lowering."

"Soon the ground will be dry,"
5ZQ-35 added.

"The next tide will soon return, too," Kamunioleten countered gloomity. "Death either way, stay or go, but I would rather die drowning than stay here for another period, or several more periods, of compression and expire in such agony as this."

"The space ship may return soon," said 19K-59, "yet it seems a poor chance upon which to gamble."

"We shall carry you at our swiftest pace," the professor assured the Emite and his three companions.

Kamunioleten considered this hopefully, while his three satellites did not think much on the matter at all, but more on their present discomfort and woe, ready to do almost anything that Kamunioleten bade them, especially if it were to escape the horrors occasioned by the leak in the castle.

Once more the machine men plunged into the watery depths under the castle to ascertain for a certainty that there was no possibility of repairing the leak. Such a course appeared useless. As the water flowed away from the base of the castle, the professor rapidly made his plans. Of the eight machine men, three were to remain at the castle until the space ship returned or until the professor and his four companions returned from the upper end of the island, 948D-21, 65G-849 and 777Y-46 were detailed to remain at the castle.

Immediately, knowing that time and speed were precious, the professor and his four machine men set out for the higher end of the island at a rapid pace, carrying the three Vosquentebs and Kamunioleten. One of the Vosquentebs claimed that he could run as fast as the machine men carrying his companions, but with foresight the professor wisely bade him conserve his energies.

Over the island's perceptibly sloping surface, the machine men carried the four creatures of the twin worlds. They knew no exhaustion—only a ceaseless, mechanical toil of metal parts under the direction of an organic brain, a brain whose every need was supplied by synthetic application of material housed in the cone-shaped heads.

They were glad to find an even and unobstructed terrain, being able to thank the levelling effects of the perennial tides for this. Farther away from the vicinity of the castle, after they had travelled what Kamunioleten told them was nearly half the distance to the high tide mark, they commenced to notice small vegetable growths and a strange kind of moss growing, luxuriant and plenti-

On they went finding the footing in certain snots none too certain, for at this level queer little animals lived an amphibious life in the succession of ehb and flow tides digging hurrows in the ground many of these hales haing partly concealed by moss and other vegetable growths Several times the hurrying machine men stenned in these and occasioned rough falls for their organic riders Kamunioleten stated however that this uncertain progress would extend for little more than a borg, for the little water animals lived at only a certain depth of attained pressure. It seemed that their hurrows remained partly filled with water at low tide, and several of the amphibians scurried out of sight from the rapid advance of the machine men and their riders, diving into their hurrows from which a splash of water geysered as they disappeared from sight.

THE five machine men had passed burrows when Kamunioleten gave a startled exclamation and pointed off into the distance ahead of them and to their right. A round, curved slice of pale brilliance lay upon the horizon and was slowly gaining volume.

"Dlasitap!"

The discovery caused the machine men to redouble their efforts, for they had no longer the fear of stepping into the numerous holes of the amphibians. Always, one of them remained unburdened to proceed some distance ahead and pick out the best course in the general direction of the highlands. Dlasitap was commencing to rise, and machine men, Emite and Vosquentebs all realized what this meant. There is no large loss without some small gain, and Professor Jameson became well aware of this proverbial truth as he realized that a much straighter course might now be adhered to in their race against time and tide, for the sun was nearly overhead by now and of less use in the matter of calculated direction.

Kamunioleten bewailed the fact that there was still a long distance to be covered. Far behind them they know that the ocean level was commencing to rise, that it would not be long before smooth, racing rollers skimmed along beneath their hurrying metal feet. The skyline now cut Dlasitan through the center, and the planet rose higher until it hung like a gigantic crescent over the thinhazed highlands in the distance, its proportions conjuringly enhanced by the magical perspective of far-away hills. Pale and inconspicuous against. the sky, other than to the anxious fugitives who fled against its ominous ascension. Diasitan rose steadily higher like the point of an otherwise invisible minute hand of a clock rising to a zenith of doom.

So it appeared to the Emite and the Vosquentebs. There existed no personal danger to the nigh invincible machine men, yet it sore beset them to lose their four charges on a matter of two points; a growing comradeship was primarily involved; and the machine men abhorred the prospects of failure, especially in so vital an issue as one of life and death.

## CHAPTER V

## BENEATH THE WHEEL

IT was one of the Vosquentebs who first gave rise to a shrill cry of alarm. Looking backward, the creature raised a limb and pointed to the rear. Far behind, a barely perceptible line of varying color, grew denser and more distinguishable, as all three of the Vosquentebs echoed the first alarm, setting up a weird din of cacophonic woe.

"The tide is overtaking us!" was Kamunioleten's nervous information.

From his position where he clung tightly to the cone-shaped head of 5ZQ35, the Emite gazed at the rapidly approaching waters and then at the rising hills within sight yet still dangerously distant.

The professor now found the terrain rougher, here and there rock formations commencing to crop out of the ground. The first roll of waters broke against the machine men's metal bodies in a much higher wave than they had expected. The professor changed their course slightly to one side and headed for a sloping ridge of rock.

"It will not be high enough but what the waters will drown us," Kamunioleten warned. "There is no high water mark upon it."

"That is so," the professor agreed,
"but it is sufficiently long so that if
we get it behind us, the force of the
rollers will be broken and progress
made easier."

This, the machine men found to be true, yet the professor pondered over the wisdom of it after all, for in so doing, they had lost a bit of precious distance, and an elongated depression lay for a considerable distance beyond the ridge, so that the machine men wallowed and splashed in deeper water than would have been the case had they held adamantly to their original course. But they soon splashed their way out of the hollow. vet to no degree did they find themselves once more in shallow water. The tide was rising much too swiftly, and Dlasitan lay far above the horizon. It behooved the machine men to know that although the castle they had left was many miles behind. and now beneath the horizon, the main rises in altitude lay within the last few borgs they were travelling. Only lately had the upward slope become distinctly noticeable.

Progress became more difficult as progress always is through a denser medium such as water. The machine men had known only too well that this would be so. All had still fresh in their memories the endless wanderings through the flooded laby-rinth of a world far behind in their cosmic course. 6W-438 was the only one of the four who recollected an infinitely longer sojourn under water on the planet of the double sun.

The rising tide swept over their metal heads and about the middles of Kamunioleten and the Vosquentebs.

"We'll never make it!" cried the Emite who, now that the machine men were unable to perceive their destination, guided them mentally. "We must swim for it, and I am a poor swimmer!"

Kamunioleten might better have said that he felt in poor condition for such an arduous task. 5Z\( 235\) felt the Emite rise to his full height above him as he strove to keep his head above the water. Dlasitap had not yet reached its zenith, and the waters were still rising, but now more languidly. Soon, Kamunioleten reported that he must let go and swim or else

be drowned. He had risen to where he stood on the four square corners of the machine man's metal body, 5ZQ35 curling his tentacles about the Emite's legs.

The three Vosquentehs had already abandoned their submerged retainers and were being followed by the three machine men who looked unward through the mechanical eve in the apex of their metal heads at the swirling, thrashing limbs of the creatures. Kamunioleten reported that the high tide mark now lay less than half a borg away. In his mind, the Zoromes detected a note of helpless desperation. He was not doing so well as the Vosquentebs who were, from hereditary environment, more accustomed to the art and peculiar stamina required for swimming.

WITHOUT a warning, the Emite gave a sudden, convulsive struggle and sank into the water among the machine men, a trail of bubbles marking his short descent from the surface. 6W-488 seized him and gave him an upward shove which bobbed him to the surface once more where he was seized upon by two of the Vosquentebs who supported him and swam in the water. Their progress became slowed and their exertions redoubled. There was nothing that the machine men could do other than hope that they made it.

That final half borg was made at a tremendous cost of effort and length of time. Worn out by the trial of air compression and jogging ride on the machine men, all four of the creatures were physically worn out. Kamunioleten was practically help-less, and although the three Vosquentebs relieved each other in supporting him in the water, they were all worn and fatigued. One of them, he

who had suffered the worst from the too rapid air decompression, would likely have drowned despite anything the machine men might have done, had it not been for an opportune occurrence.

Diasitan had reached its zenith and was falling towards the horizon opposite to the one from which it had risen, and the high tide had commenced to ebb. The sun, too, was lower, and this sided the recession of the water. The weary Vosquenteb finally gave out and sank helplessly into the light green depths. The professor seized him and pushed him back up again, finding that by holding the Vosquenteb's feet over his metal head he could keep the other's head above water. The machine men now held all three of the Vosquentebs once more. Kamunioleten, having lost consciousness, was upheld and kept floating by two of his servitors who in turn were kept up by the machine men. It was decided that no more progress would be made, and here they waited for the ebbing of the tide.

The recession of the waters was surprisingly rapid as both Dlasitap and the sun simultaneously eased their attraction. When the machine men's heads broke the surface of the water. they were surprised to find themselves less than two hundred yards from the high water mark which stood out damp and clear against a rising hill in the foreground. It was nearing sunset as they climbed the hill where it was decided that they rest until morning came. Rest was a superfluous requisite to the machine men. vet they were well aware that their organic allies would require recuperation.

Against the subdued brilliance of sunset's glow they saw from their

low eminence a gigantic wheel upraised above the ground, dwarfed in perspective of several borgs' distance. Kamunioleten, who had just revived from the second and most alarming of his reent ordeals, told them that it was one of the great wheels used to hurl the passenger projectiles off into space towards Dlasitap.

All that night, the machine men waited beside their four organic friends who rested upon the hill overlooking the high tide mark. The sun gone, Dlasitap shone brightly only a short part of the earlier evening, a hanging crescent surrounded by the glittering stars, a few of which shone dimly through the twin world's atmospheric halo. Dlasitap disappeared, leaving in its place more stars which shone the brighter because of its absence.

Looking up into the night at the far-off stars, the machine men could only wonder where the space ship was with their metal companions.

Were they at that moment returning across space, or was something detaining them?

A suggestive lessening of darkness. followed by a weak flash of light, announced the coming dawn, Knowing that Kamunioleten and his three servitors could well do with all the rest they might obtain, the machine men let them slumber on undisturbed until after the sun was well into the sky. It was then that one of the Vosquentebs awoke, and, shortly after, Kamunioleten opened his eyes. The sleeping Vosquentebs were aroused, and the nine fugitives from the fearsome tide started for the village where the wheel held towering dominance above the rows of houses around its base. As the machine men came nearer, they saw that these houses were built mostly of stone, a few of the poorer ones made of an adobe mixture which they learned was obtained from a peculiar section of the seashore at low tide.

Several Vosquentebs first discovered the party and fled in alarm at the strange apparitions of the Zoromes in company with three of their kind and the Emite. Straight into the village walked the nine from the flooded castle. Now, several Emites came to meet them, a bit falteringly, summoned by the excited Vosquentebs. They recognized Kamunioleten and their apprehensions regarding the metal monsters beside him were partly vanished.

"What do you do here, Kamunioleten?" he was asked. "And what are those machine things with you?"

"I am come from the castle," replied Kamunioleten, evasive of the query concerning his metal allies.

"You have no right up at this island's end, Where did you get a boat?"

Again the exile answered only the leading question.

"The castle has sprung a leak and is flooded at high tide."

The crowd of Vosquentebs and Emites increased until nearly the entire village was assembled. There were no more than forty Emites to the Vosquenteb population of two hundred, yet it was apparent that the Emites were the accepted masters. The five machine men were regarded with suspicion, even after Kamunioleten had explained that they were creatures from another world and would harm no one who did not attempt to harm them. It was apparent to the minds of the machine men that these Emites disliked the exile and bore him ill favor. What they might have done with Kamunioleten.

had the machine men not been with him, remained largely problematical, yet it would be supposed that they would have imprisoned him until word was transmitted to Bemencanla, as these Emites were his minions.

THE machine men of Zor put such plans beyond their temptation by casual feats of strength, stamina and invincibility which cultivated a passive respect and fear in the days that followed, though underneath, there lurked currents of hate, fear and suspicion, all too plainly visible to the machine men and faintly perceived by the less receptive faculties of Kamunioleten. Here, on the upper end of the island, the machine men took up quarters and once more waited for the return of the spaceship, knowing well that as soon as it landed by the castle the three Zoromes left behind would inform 744U-21 of their whereabouts.

During the interim, the machine men examined the catapult wheel with avid interest. It was nothing more than a gigantic flywheel, geared up and fitted with a drive shaft and run by steam power. An enormous firepit yawned like a cavern underneath the huge, metal boiler whose square walls were of surprising thickness, Kamunioleten explained, to a stand the terrific strain.

"We fear the bursting of the steam chamber more then we fear the breaking-up of the wheel from being whirled too rapidly. The wheel is of very light metal in order to lessen the strain of centrifugal force and avoid the accidents of earlier experiments with heavier metals."

Prefessor Jameson found the diameter of this particular wheel to be slightly less than two hundred and ten feet. To gain the necessary speed of considerably more than two thousand miles per hour, this would call for more than five revolutions a second before the affixed projectile might be released.

The wheel was made of several large sections running diametrically, strengthened here and there quite cleverly. The latter ability the Emites had learned through bitter experience rather than by genius, for actual experience had made a mock of many of their painstaking figures. The huge sections of the wheel, the machine men learned, were made upon a distant island of Selimemigre where the best metals were found to form the strong alloy. The massive, though surprisingly light sections were towed to their destinations on huge floats fastened behind ships.

The wheel on this island was rarely used as was evidenced by the condition of the fire pit beneath the boiler, which latter was cleaned and oiled to prevent deterioration. The professor suggested to Kamunioleten that their alloy be made rust-proof, to which he replied that many of the wheels were coated with a rust-proof preparation of metal which was applied in the molten state. He professed to know little concerning this phase of the construction other than to assert that a rust-proof alloy had been made once, but was found on practical experiment to be too weak.

"Still in a rather crude state," 6W-438 referred to the wheel, "yet give them time."

The machine men hungered for a demonstration of the wheel, yet their curiosity remained unappeased, for there arose no occasion for its use. As they had discovered, this wheel was rarely used for its purpose of hurling miniature space craft into the ether between the twin worlds. More time passed. Still the space ship did not arrive from Dlasitap. The machine men were growing restless in the absence of their companions, especially in the face of the ever present uncertainty. Finally, Professor Jameson made an electrifying statement, a statement fraught with stirring possibilities.

"We are going to Dlasitap."
"The wheel?" cried 6W-438, rapidly divining his thoughts.

"The wheel," the professor replied.
The professor made known to Kamunioleten his intentions, and the latter not only expressed surprise, but fear and anxiety as well, anxiety for the machine men as well as for himself.

"I would not trust these fellows of mine if I were you," he warned the Zoromes. "They may send your projectile on a fatal course even as was the common fate of my Administrators."

"You will be here to superintend," the professor added, "and besides, two more of the machine men will be left here on the island with you, for not only must the wheel be well attended on our parting, but you could well fear for yourself if left alone here with the hirelings of Bemencaula."

PROFESSOR JAMESON assigned 52Q-85 and 8L-404 to stay with Kamunioleten and help in the operation of the wheel. The Emite knew something of the wheel's operation, especially the estimation which must necessarily be accurate to insure a safe arrival on Dlasitap. This estimation called for a choice of certain portions of Dlasitap to face Selimemigre at the time the projectile was released from the wheel. Also, the gross weight of the projectile and

its occupants must be considered in connection with the speed of the revolving wheel, for the projectile might fare disastrously should it reach the other world shead of or behind its planned schedule. A return trip did not offer so many dangers, for Selimemigre offered several more times the area of water for allowance of mistakes than did Dlasitab.

None of this would Kamunioleten and his five metal allies dare to leave to the trust, even jointly, of the Emites on the island, so Professor Jameson sent back to the castle for two of the machine men who, after the projectile had left for Dlasitap, might return to their solitary companion awaiting them at the lower end of the island.

In this manner, the three machine men who were preparing for the novel crossing of space to Diasitap in search of the space ship's whereabouts, now had Kamunioleten, four of their metal brethren and the three Vosquentebs to aid them in their takeoff.

Professor Jameson, 6W-438 and 19K-59 closely examined the four metal projectiles grouped in one of the smaller buildings about the base of the great wheel. With interest, they tested them, and with the Emite's suggestions made their selection. Rapidly, they learned the few requirements necessary for what little operation the projectile would need as they fell upon Dlasitap.

The fanwise atmosphere brakes were found to be in excellent working order, ready to be unfolded from the miniature space ship at the proper moment, while the light metal parachute was also found to be in easy working order. A test was given the heating system of the projectile, and sa preliminary to starting, the pro-

jectile was well fueled, this latter requisite also being essential to the steam-driving power, readily attached when the projectile bobbed to the surface of one of Dlasitap's larger bodies of water.

Timid and distrustful of this pioneering, crude travel of the Emites, Kamunioleten expressed his fears at the same time he was wishing the three Zoromes a successful trip.

"You made the trip once without mishap," the professor reminded him.

Kamunioleten's pessimism re-

"But I was making the trip the safer way-to Selimemigre, not to Dlasitap, If I recollect right, the destination of our projectile failed by some seventy borgs or more the position our senders had selected for us to come down, but the nearest land lay a good hundred and ninety borgs away-one of the larger islands-and so the mistake amounted to naught." And here the Emite added a bit of possible cheer to an otherwise revelation of dismal possibilities. "It may be that our senders estimated roughly and without due care because they knew of our comparative safety in that vast expanse of water for which we were headed."

## CHAPTER VI

## A PERILOUS VOYAGE

THE trip mechanism for releasing the projectile from its straining hold on the rim of the giant wheel was located at the outer end of a long arm extending from the gear-housing of the massive axia. From below, a towering drive shaftloomed gigantically out of the lesser compartments attached to the souat. steam compressor. Like the light, yet amazingly strong alloy comprising the wheel itself, this drive shaft's composition was constituted similarly though with a varying regard for friction in parts where friction ensued desnite lubrication.

The Emite and the machine men carefully made their calculations; then they waited for the day to come when the position and surface of Dlasitap would be most opportunely situated. They had but little more than two days to wait, when at high tide the time for the crossing was at hand. Kamunioleten, wishing the three metal adventurers well, expressed his relief that he was not going with them, in spite of his strong desire to return again to the home from which he had been exiled.

With something akin to excitement, Professor Jameson, 6W-438 and 19K-59 watched the three Vosquentebs fueling the fire pit beneath the steam compressor which held just the right amount of water. The Emite, giving them his final farewell and best wishes, bade them enter the projectile and screw down the hatch, From several transparent facings, the three Zoromes looked out upon the further proceedings, or what could be seen of them through the blurred window composition, its defective condition caused by inner partitions between its layers, corresponding to the inner, middle and outer hulls of the projectile to retain the heat of the craft and restrict the effects of unveiled sunlight. These transparent facings could be covered from within at will.

Smoke arose from the fire pit around which the Vosquentebs scampered excitedly in the gathering glow like rejoicing imps before an inferno. Kamunioleten with two of the machine men were out of sight in the near-by building where steam pressure became regulated. There was an interval of waiting.

A cloud of steam burst suddenly from around the base of the towering drive shaft, its loud hiss unheard by the three machine men inside the projectile at the bottom of the motionless wheel. High above, on the roof of the gear-housing stood 8L-040, his tentacles ready at the trip, prepared to release the whirling projectile at the precise moment when he was signalled from below. All about the wheel, standing at a respectful distance, stood the inhabitants of the island. Emites and Voscuentebs.

"Soon, the wheel will start turning," 777Y-46's mental note penetrated the metal projectile. "Be sure you have the straps secure about yourselves."

The three Zoromes glanced quickly at each other across the narrow confines of the projectile, shaped like a short hallway of their own space ship. A tiny compartment operating the mechanism lay in the rear, while up in the prow was stored fuel and supplies, including the navigation facilities for making the projectile into steam-driven boat when they reached Dlasitap. Of the air rejuvenator, they had no use, and of the heating equipment they would have had no need had they possessed their headgear for temperature equallizing, but, as it was, this latter equipment lay aboard the missing space ship, and so a small amount of heat would be necessary later on when their present supply of natural heat waned.

A S they had calculated, Dlasitap would rotate completely some three times or more ere they crossed the hundred thousand miles of space separating the twin worlds. They would leave for Dlasitap travelling close to twenty-five hundred miles per hour, according to the professor's condensation of Kamunioleten's borgs and whegs. They would slow to nearly zero half way to Dlasitap; then the speed would once more accelerate as they dropped toward it, giving them somewhat of a two thousand mile per hour average for the entire trip.

There came a perceptible motion, and the scenery moved slowly, distortingly, through the crude transparency. It was like the initial rise in a Ferris wheel at a county fair. This similarity struck the professor across the scarcely conceivable abyss of forty million years. He noticed a gradual change of gravity, for, unlike the recollected Ferris wheel, the projectile remained immovable on the immense rim. Scenery flew by faster until it became no longer distinguishable, the accelerating revolutions resolving into a blinking alternation of bright sky and gravish, purple land and foliage, the lesser green spots merged into obscurity.

The professor's sensations now became those which he recalled from his boyhood in an age-old past of another far-flung life. He had allowed another boy to roll him around inside an auto tire, bracing himself triangularly with back, feet and hands. The sensation had been a novel and enjoyable one until one of those sudden, mischievous urges had caused his pilot to send the tire rolling rapidly down a grassy slope, This flitting recollection was lost almost instantly as the professor noted further that there was no longer a change in gravity. There was but one gravity, and in but one direction, and that was outward, the synthetic gravity induced by centrifugal force.

Faster and faster the wheel flew. Soon, they would be making about five revolutions per second, providing the necessary component to send them flying out of Selimenigre's gravitational attraction at a speed greater than that with which they would proceed towards Dlasitap, slowly losing momentum until they passed through neutral territory.

Suddenly upon their senses there burst the telepathic cry of 8L-404.

"Now-be ready! You leave for Dlasitap!"

Gravity quickly altered its position. From one side of the projectile it shifted to the base. In this manner only did these three machine men realize that they had been released from the giant flywheel. Yet the professor also noticed that the flickering changes of light and shadow previously seen through the ports now yielded to a steady filter of soft light, and this, while he was considering it, dulled into darkness as the projectile rushed rapidly out of the atmosphere, guided unerringthy by stabilizer fins.

They were in space, launched on their hundred thousand mile journey at a pace close to twenty-five hundred miles per hour, an initial momentum which Selimenigre's attraction was carefully calculated to reduce to a speed comparatively close to zero motion ere the projectile fell into the attraction of Dlasitap. From that point on, they might expect their speed to become accelerated quite rapidly.

Peering out of one of the windows, the professor bent forward from his straps to note the position of Diasitap. Relief smote him, for one of their chief worries was removed. The projectile was headed in the right direction, though not directly for the great globe, being aimed ahead of its course so that the focal point of attraction beyond the field of neutral gravity would coincide with Dlasitap's current position at that fateful moment.

"We can remove our straps now," said 6W-438, "Let us take a look around."

It was scarcely an unfamiliar panorama which lay about them; it was rather a warped vision, however, due to the crude qualities of the observation facings. Selimenigre, what little could be seen of it from ports designed almost exclusively for side and forward observation, loomed huge in their rear. On all sides and ahead lay the fiery firmament with Diasitap growing slowly gibbous ahead and slightly to one side of their course.

The machine men now commenced a patient wait, not without anxiety, for their projectile to come in close to Dlasitap. The better than twentyfive hundred mile rate, which was already beginning to slow up from the tremendous, attractive bulk of Selimemigre behind, seemed agonizingly slow to the three Zoromes who were familiar associates with cosmic speeds many times faster. To record the passing of time, they took occasional glimpses of Dlasitan's topography, the slow moving continental masses serving as the figures of their celestial clock.

PATIENCE was an accomplishment among the metal Zoromes, yet in this insecure and helpless position they remained a bit on edge. What if the projectile was not aimed at the right spot ahead of Dlasitay's present position? Worse, and more probably than missing the twin world entirely, was the likely hazard of hit-

ting solid land instead of the ocean depths which they had been carefully timed to hit. The professor could not help but dwell on this discomforting thought, roundly denouncing his impatience at the delayed return of the space ship. Here he had placed himself and his two metal companions in what might well prove to be an uncompromising alliance with death. Here was scarcely wisdom but another impulsive and adventurous gesture such as his entrance into the transition cube of the Tripeds. Yet he argued with himself that he owed such a course as he had chosen to the circumstances surrounding the failure of the space ship to return. He recollected well his timely arrival on the island of light as the center of the hydrosphere's hollowed core, discovering 744U-21 and several more metal companions in dire straits. The possibilities in this situation promised to be much the same.

The professor's conscience, however, remained unsatisfied despite such obvious and seemingly incontrovertible logic which he had offered himself so convincingly. Behind this logic there lurked the unquenchable spirit of adventure ever ready to force him and his companions into any novel experience, represented in this instance by the giant flywheel and its unguided missile now hurtling through space towards Dlasitap. In the background of this colorful venture lurked the storm of tracedy waiting to loose its thunder of destruction and lightnings of death. Kamunioleten's tragic philosophy had not been one to fill them with the sense of security and fatalism they generally employed.

With agonizing slowness, Dlasitap made a complete rotation. By this time, the three Zoromes found it necessary to commence operation of the heating system in a temperature which would have frozen either the Emites or Vosquentebs, 19K-59 remarked upon the lessening of gravity in their rear, and soon the machine men were able to float about their limited confines like wind-blown feathers in a dense atmosphere. This, as Diasitan slowly loomed larger, resolved itself into a slight gravitational attraction at their prow. Meanwhile. Dlasitan had made its second complete rotation since they had left Selimemigre. Whatever fears they might have entertained regarding the possibilities of falling back upon Selimemigre due to the lack of a sufficiently strong push had now vanished.

This latter fear was now replaced by the apprehension that their initial push might have been too great. This exigency involved the likelihood of missing the spot on Dlasitap at which they had been aimed, or else the risk of super-momentum, in which case their brakes and parachute attachment stood in danger of being wrenched free of the tiny craft, Both could easily happen, and the professor found himself in a position to agree with Kamunioleten's dissatisfaction with present interplanetary travel of the Emites. What they needed most was maneuverability in space.

"We have not long to wait," the professor observed, reflecting a bit of the nervous waiting shared by his companions.

It was this waiting, the slow rate of interstellar speed, a mere average amounting to two thousand miles per hour which irked them. They had all faced more desperate circumstances in the late space war with the

Mumes, with less regard for their futures than now. But those encounters had been swift and decisive. There had been little waiting. Coupled with the delay of landing on Dlasitap, they were faced with the knowledge that what little control they possessed over the projectile must be held suppressed until almost.

the final moment They were picking up speed once more, regardless of the fact that the increase went unnoticed. Yet they knew it to be so, and Dlasitan grew large before them. The professor was glad that the projectile had not turned about during the time they had left the atmosphere of Selimemigre, although the stabilizer fins would have righted this on their entrance into the air envelope of Dlaritap. The prow pointed directly at the center of Dlasitap, and there would be no delay in the use of an air brake preceding the parachute's release.

In the small, rear compartment at the controls, 6W-438 strapped himself securely against the forward pull of Dlasitap's attraction. 19K-59 and the professor strapped themselves midway of the slim cylinder where contact with the walls might be avoided on their landing, yet where they might see what lay ahead. They had not long to wait.

Down they hurtled towards Dlasitap. A faint haze replaced the jet blackness of space with its twinkling stars. Kamunioleten had told them that their first encounter with the atmosphere of Dlasitap would find them over a hundred miles high. At their rate of speed, the professor had figured beforehand that a rough two and a half minutes would elapse before they reached the world's surface. This time must be lengthened considerably if they were to effect a safe landing, by use of the air brake

\*\*CTHE air brake!" the professor cried, peering down at the bulging surface of Dlasitap whose curvature merged more and more into the horizon as the projectile screamed and walled through the atmosphere in its furious descent.

The machine men felt themselves jerked so hard that they pondered swiftly how organic creatures like the Emites could ever live through such an ordeal. 6W-438's release of the air brake had been consummated much too swiftly however, so much too swiftly that for a moment he was left dazed from a smash of his metal head against the partition behind him, a blow sufficient to have broken any skull comprised of bone.

Transecting the rear of the projectile, a broad, flat disc comprised of segmented, interlocking, metal staves, hastily released, braked their rapid speed through the increasing density of air. Professor Jameson looked anxiously downward to where a long, rocky headland jutted into the ocean for which they were headed. It seemed as if they must strike, for the headland law directly below.

"The metal parachute! Release it!" 6W-438 did not hear the order. He had not yet fully emerged from his shock of contact with the partition. Dangling loosely in their straps, several of which had been snapped at the sudden yank of the air brake, the professor and 19K-59 desperately regarded their swiftly impending fate.

"The parachute!" Professor Jameson echoed. "Quick!"

It was into the mind of 6W-438 that these anxious thoughts gradually crept, clearing his torpid senses and sending a tentacle flashing to a

pair of long handles which he turned rapidly. Behind the slim, metal bullet, a pleated column of thin metal unhinged itself, and caught by the wailing winds quickly grew coneshaped like the heads of the machine men themselves. Once more the three Zoromes surged forward in their straps, a hurried glimpse of the professor's confirming his worst fears. They were rushing down upon the edge of the rocky headland where water and beach merged into foam.

"We shall crash!" was 19K-59's

terrifying emanation.

Less than five miles lay between them and death, and this respite was being rapidly eaten by the rushing projectile as it tore madly through the air. Another quick observation afforded the professor by the now swaying projectile gave him a sudden spark of hope.

"We have side-swiped!" he told his metal companions. "The parachute's imperfections are throwing us a bit to one side of a vertical fall!"

"Not in time!" was 19K-59's foreboding. "The water, even if we do strike it, will be too shallow!"

6W-488, in the partitioned rear, could not see forward and said nothing, attending the scanty controls according to the observations of his companions.

Land rushed upward, land and water. Now, they were so close that even 6W-438 could distinguish their proximity.

"Shall I let go the parachute?" he exclaimed, remembering Kamunio-

To retain the parachute as they struck meant a rupture of the projectile even if they hit water. But Professor Jameson had already made his gamble with fate.

"No! Keep it!"

## CHAPTER VII

LOST IN THE SEA

struck. The remaining straps were broken from the professor and 19K-59. hurled them into a tangled heap among the fuel supplies of the forward compartment. Almost simultaneously, there came another terrific shock, and as the professor's senses left him in a bright flash of light, the interrupted thought smote his mind that they had struck in shallow water.

The truth of the matter was too swiftly consummated for the brief consciousness of Professor Jameson to fully apprehend. They had indeed struck shallow water, but not so shallow as his dying thoughts conceived. The second impact was no less than the trailing parachute jerking their dive to a less hazardous sneed as it caught the water.

6W-438 came to his senses and looked about him. His first conception was the vague sensation that he was lying in water. Possessing scarcely any sense of touch beyond tangible contact, or a change in solids, this divination was truly remarkable. He affirmed this supposition as consciousness gave his brain access to mechanical eyesight. Something weighed him down, and from off him he shoved some of the wreckage of the metal parachute.

He arose to his feet and found himself mechanically uninjured. In the clear water all about him, and far out of sight over his head, swam fishes of various sorts, a few darting curiously in and about the wreckage of the projectile. He looked about him for 21MM392 and 19K-59. Not until he had peered beneath broken sections from the projectile. did he realize that not only were his metal companions gone but also the entire forward section of the interstellar projectile. That it had broken apart when the parachute had struck the water he now fully understood.

His companions and the rest of the wreckage were somewhere else. He turned slowly and looked in every direction. Finally, several hundred feet off, he saw what was left of the forward section. It lay crumpled, the metal legs and lower half of a metal cube extending from in under it. 6W-438 slowly approached, and as he did so he saw the other muchine man lying half buried in the mud a few yards from the wreckage. It was 19K-59, while under the semi-remains of the projectile lay 21Mm392.

19K-59 stirred himself and arose amid a cloud of muddy water. Together, he and 6W-438 dragged the professor out from under the wreckage.

"Is he dead?" queried 19K-59, his brain still muddled from the swift succession of events and the subsequent crash.

"I do not know," 6W-438 replied fearfully. "His head seems undamaged, yet—"

They examined the professor. His body had lost a tentacle, and one leg was slightly bent yet still usable. 19K-59, it seems, had been thrown clear. Both Zoromes carefully probed the professor's brain with their own thoughts. His own brain structure, unless left open for reception, had always been a difficult one for the Zoromes to penetrate, but if any of them had learned this art to particular advantage over their fellows it was 6W-43S. A glad exclamation escaped his mind as he felt signs of life in the professor's mind.

Patiently, he and 19K-59 waited,

and sure enough, after a lengthy interval 21MM392 came to his senses and slowly arose to his feet. For a moment he recollected nothing, and then memory returned.

"The projectile broke into two parts when the parachute caught hold of the water," 6W-438 told him. "I sank with the back compartment, 19K-59 was thrown clear, while you fell with the front section."

"We must get to dry land," the professor stated as he gathered his faculties once more.

"How deep do you suppose this water is?" 19K-59 ventured.

"It is difficult to tell," 6W-438 replied, looking upward through the eye in the apex of his conical head. "Due to the unusual brightness, it would not seem to be very deep, but the water is quite clear, and we may be in very deep water."

"Look for the incline towards land," the professor instructed. "I wonder how far away, and in what direction, that headland rises out of the water."

"It cannot be far," 6W-438 stated,
"if what I remember from my final
observation is correct."

As the machine men walked, the water grew darker, and they knew that daylight was slowly ebbing in this hemisphere. After dark, they still continued aimlessly until they realized such futility.

"We could wander erratically for a long time over the ocean bed and never get anywhere," the professor remarked. "There are no landmarks or celestial objects by which to set a course."

So they waited for daylight which was later in coming here in the watery depth. They were only roughly aware of how much water lay above their heads, the professor computing it to be less than a hundred feet, though he was not certain of this. There was one encouragement. The pressure of the water grew lighter, and they knew that they were approaching shallower depths.

Another night came and passed. They did no walking during the night; then found their way towards the shore with morning. Often, they climbed what appeared to be knolls on the sea bottom. They came across all sorts of marine life, sea life in strange, fantastic forms. On one of the sea highly the sea for the surface above them. At the professor's experiment, they climbed each upon the other, yet the surface lay out of their reach, and no observations could be taken.

They discussed the direction they would take. Already, they had done much fruitless wandering. While they pondered the possibilities, the water grew darker. It seemed too soon for late afternoon twilight, and the three Zoromes looked up to see a dark object hovering above them. Into the mind of Professor Jameson flashed a memory of the huge fish which had swallowed 88ZQ4 and himself when they had sunk into the depths of the hydrosphere, vet this shadowy object above them moved too mechanically and majestically to be a fish. Moreover, its movement was too sluggish for association with the marine denizens.

66 A BOAT!" flashed 6W-438.

"Quick—climb up on me and seize hold of the bottom!" the professor decided rapidly as the keel swept low over their heads just out of reach.

6W-438 was the first to mount and

curl his tentacles about a weird contrivance serving as a rudder. It could be better termed a steering arrangement, for it in no way resembled a rudder such as Professor Jameson had known on earth. 19K-59 was next to be assisted by the professor from below and by 6W-438 from above. Last, the professor leaped upward and seized the helping tentacles of his metal companions to be hauled to a position where he, too, could command a secure hold.

"This is our best chance of making dry land," he told them. "Sooner or later, this ship of theirs will put into a harbor."

"It may be a long trip."

"But we are sure of a destination."

Resolutely, the three Zoromes clung. They could climb no higher, or they would have boarded the boat. It was deemed the better part of discretion not to make their presence known unless they were able to board, for they had no knowledge of what measures those on the boat might take. They strained their intellects for information from the minds of those above. This they finally learned. They were on a commercial boat bound for Onolekag, and the boat was rapidly nearing its destination.

"It is a seaport city," the professor remarked, remembering what Kamunioleten had told him, "a seaport on the ocean for which we were aimed, if my geography of Dlasitap serves me right."

From above the machine men, the dull, throbbing sound of mechanism reached them, yet on either side of the boat they saw the water disturbed by long sweeps which propelled the vessel forward, the latter suggestive of organic labor.

The light waned, and soon dark-

ness came early in the watery depths. All afternoon, they had seen the bottom of the sea sliding past beneath them, their only gauge of progress. Strange to say, the water had not grown shallower, though according to the thought transmissions received from the deck they were rapidly making port. It was evident on second consideration that the vessel was keeping to the deeper lanes of travel near the seacoast, and that their previous passage through the shallower waters had either been unavoidable or else was a mistake on the part of the pilot.

Night fell, and when dawn followed, the waters commencing to grow murky with light, the three submerged stowaways found the sweeps at rest and the vessel slowly drifting. The mechanism still labored above but with a subdued note to its voice. For some time during the darkness, the machine men had been aware of an abatement in sneed.

While they considered the situation and sought to probe the minds of those above them, something shot overboard, ploughing the depths and followed by a streamer of tiny bubbles which fought their way back to the surface. In the growing light, they saw a great weight settle on the bottom, a weight to which was attached a long line.

"We must be in the harbor of Onolekag," said the professor, peering down at the smooth bottom below them. "We shall investigate. Stay here, 19K-59, while 6W-438 and I look for shore. If we become lost from the boat and do not find shore, guide us back. If we find shore, we shall call to you."

This precaution, though wise, was found to be scarcely necessary, for the two machine men wandered into shallower water among rough, rocky columns supporting the docks of Onol-ekag. They announced their discovery to 19K-59 who soon joined them. The three Zoromes quickly found their way out from under the dock and emerged from the water on a stony beach. From this place they had their first view of Dlasitap, of the surface of that world.

In the early morning sunlight, they looked out upon the harbor of Onolekag where several boats lav at rest upon the water. High in the sky, the old crescent of Selimemigre, the world they had left three days ago. by Emite reckoning, floated pale, its topography lost in the dazzle of sunlight upon its watery surface. Several Emites moved busily about the dock at this early hour, not yet having noticed the three machine men who had slipped quietly out of the water. The latter were at a loss to pick out the boat which had brought them, but the mystery of the sweeps and accompanying sound of mechanism was explained.

The long cars were operated by a steam engine. A long drive shaft between decks worked back and forth, performing the movement of a long oval, lifting the sweeps out of the water on the under path of movement and pushing them against the water on the upper travel. One of the smaller boats just setting out from the dock gave demonstration of their smooth working efficiency.

SUDDENLY their attention was distracted from the boats by a cry from the rear. An Emite had seen them and was calling the attention of all near and far to the strange sight the three Zoromes presented as they walked slowly to the dock. Some of the Emites ran in terror, adding to

the general chattering din, while others advanced half fearful yet curious. The machine men radiated their thoughts, attempting to placate the apprehensions of the Emites. This they did, partially, yet distrust and lingering suspicion prevailed.

"Have you never seen or heard of anything like us?" the professor asked, indirectly seeking word of the space ship.

It was evident that sight of the machine men was something new for the Emites, nor had they ever heard of them.

"We are from another world," the

This information was immediately seized upon by the Emites and relayed into the reference to "thinking machines" from another world of their planetary system, a world other than Selimemigre.

"Enitizes, your grand capital of Dlasitap is not far from here—not more than seventy-five borgs, is it?" the professor asked.

The affirmation was immediately provoked in the minds of the Emites, who marveled that these mechanical thinkers should be from another world and still know so much about the private affairs of Diasitap.

"We wish to go to Enitizes," the professor asserted, avoiding information of the fact that they were come from the twin world of Selimemigre.

In this desire they were to be satisfied sooner and more elaborately
than they could have expected. Out
of the city a military detachment
came running, surrounding them and
forcing them upon a boat. Word had
passed into the city that enemies
from another world had come to
Dlasitap. Coincident with their plans
to go to Enitizes, the machine men

found that they were being transported there aboard ship as prisoners, for Onolekag had no place to keep them.

This had all been done so rapidly as to surprise the three Zoromes. who, as their desires were being consummated, submitted peacefully, But from their captors' minds they stole information bit by bit during the trip to Enitizes, learning that a few of the nations of Dlasitap were straining at diplomatic relations, and armed forces were ready for any hostilities which might arise. The weapons of the Emites they discovered later were not unlike short rifles. which, under air compression, shot forth small pellets of explosives which detonated against whatever they happened to strike, 6W-438 was hit by one when an over zealous Emite forced him back from the edge of the boat where he had been regarding the operation of the mechanical sweeps. No damage, beyond a slight blackening of a metal leg where the pellet had exploded, was suffered by him.

Shortly after sunset, they rode into the harbor of the great city of Enitizes, an international city of Diasitap, where the world government held forth in all its pomp and power. The city was not only larger than the one they had just left, but it boasted more pretentious buildings.

Without ceremony, the three machine men were escorted to the city's museum where their metal legs were chained to the gigantic cube of rock on which they stood for the curious eyes of the Emites. Nearly the entire populace of Entitizes thronged the great hall, coming and going during the next few days in order to see the strange thinking machines from another world. The three Zoromes re-

garded the chains in secret amusement, especially the professor, for in his fore tentacle he carried a heat ray of intensive power which would melt through these light metal alloy chains as if they were no more than hempen cords. For the time being, they were willing to submit to these measures, searching the minds of those who came for an inkling to the lost space ship and its occupants.

"Where do you suppose it is?"

19K-59 opened the question uppermost in the minds of the three.

"An accident out in space, perhaps," 6W-438 suggested. "They may be somewheres out in space at this moment still making repairs."

"It is more likely that they have landed on Dlasitap in some isolated spot," said the professor. "In a few more days, unless we find out where they are, we shall leave this place and discover what transportation facilities exist for a search on other parts of Dlasitan."

Several more days passed. The throngs of curious Emites did not diminish in numbers, for the report of the thinking machines had spread afar, and many were coming from other cities to see the strange creatures. The machine men remained aloof and uncommunicative much to the chagrin of the various Emites who were most scientifically curious, but it was generally understood that they were from a distant world and that their space ship had fallen into the ocean.

With interest, the machine men learned that the Administrators were soon coming in a body to view the metal curiosities that had been so easily captured. Great preparations were made ready for the honored visit, and a broad dais with luxurious seats was built directly before the

three curious exhibits. The seats could scarcely be called chairs by the professor who noted their peculiar structure adapted especially for the four legged creatures.

On the day looked forward to, the great hall was crammed to its utmost capacity with Emites, and the seven Administrators, true to universal form, magnified their pomp and importance by a late arrival. The building echoed and re-echoed to the acclaiming din, and, also universal in custom, the occasion called for a speech. It was from no less than Bemencanla himself.

### CHAPTER VIII

### ZOROMES BESIEGED

HE machine men found that he differed little superficially from the general run Emites, but within his mind they readily discerned the turbulent. treacherous currents of avarice, cunning and hypocrisy. Bemencanla's speech ran true to form. It was flowery, exuded patriotism and honor, and cited the magnificent progress under the recent regime, utterly ignoring the strained ties which now existed among several of the nations. The Grand Administrator reached a point where, in quivering wrath, he referred to the demise of the previous regime.

"And Kamunioleten, that archernimial who so ingloriously brought his comrades to an untimely death, should no longer reap a profitable luxury in exile on Selimemigre! Legislation should be, and now is, in the making for his execution, a long delayed justice to the rights of our citizenry! One who would east his fellow Administrators to meet death

in space in order to achieve his own selfish ends is no longer fit to live, either on Dlasitap or Selimemigre!"

As Bemencanla paused for breath and to instill a greater significance to his words, another voice interrupted, a silent voice that gripped the minds of the assembled thousands.

"Those last are the truest words you have spoken! But in those words you have not described Kamunioleten but yourself! You, Bemencanla, were the one who planned the hideous crime you have just described, planning it so cleverly as to cover Kamunioleten with the blame!"

This message rang like a siren in the minds of the gathered Emites. In Bemencanla's words, Professor Jameson, irked by the past few days of inactivity and lack of information regarding his lost companions, recognized an opportune moment. He paused in the midst of the gasp which went up from the stricken Emites, as they realized that from this walking mechanism had issued a vibrant denunciation of Bemencania. The Grand Administrator's face blanched. while the mouth on the top of his head fell open in dumb surprise and consternation. The professor continued, citing, in clear thought pictures and mental suggestion, the entire perfidy of Bemencanla and the injustice done to Kamunioleten. It was all done so rapidly that in the hush of surprise there was little time for action. Remencania was the first to recover.

46 A LIE—a great lie!" he shrieked. "These metal things are an invention of Kamunioleten flung across space to finish the ruin he commenced! Destroy them! They must be destroyed at once!"

The spell was broken. The guard surrounding the Administrators' stand shoved their way towards the block of stone on which the machine men stood chained. From a curling tentacle of one, they saw a dazzling, blinding light throw its aura about the chains that bound it. Before they realized what was happening, they saw the machine man free of the chains and at work on those which held his companions. Several chugging sounds were followed by small explosions about the body of the Zorome who worked unscathed and little perturbed by the guns of the approaching guard.

Entirely free of the chains, the three machine men waited for the guards who, with more bravery, than good sense, mounted the block of stone to overwhelm them. There followed more firing of guns before they came to grips, and then the machine men picked up their recent captors and hurled them out into the excited, milling throng, whose combined voices were throwing the place into an uproar that made the building tremble.

"How are we to get out of here into the open?" 6W-438 queried. "Follow me." was the reply.

Adjusting his heat ray to low intensity. Professor Jameson leveled it at that section of the throng opposing their passage to the nearest exit. Badly burned, the screaming Emites opened a lane by scrambling out of harm's way over the heads of their more fortunate neighbors. Out of the museum and into the city avenue ran the machine men of Zor, still undecided on a course. From near and far came running thousands of the Emites attracted by the uproar.

"What about the dock?" 6W-438 suggested. "They can overcome us

by sheer weight of numbers here. We can either steal one of their boats or else hide in the ocean."

But now the machine men were at a loss as to the direction in which the harbor lay. 19K-59 believed he knew the way, and they ran in that direction, only to meet a wall of excited Emites, aroused and brandishing various types of weapons.

"Remember the Aytans!" cried 6W-438. "We must not let them snare us!"

The machine men turned and ran down another thoroughfare. Soon, they met another wave of the creatures, several hundred strong, choking the street as far as they could see. Again they made a right hand turn into the path of least resistance. This course took them into the vicinity of what the machine men took to be industrial buildings. Ahead of them, they saw no resistance, yet behind and farther away on either side they could hear the din of the menacine mobs.

"They are herding us!" the professor warned. "This way is too easy!"

"How could they have become organized against our escape so quickly?" interjected 6W-438.

This question remained unanswered as the machine men hurried onward. With sudden despair, they saw a yelling horde break suddenly into the avenue from both sides just ahead, having emerged from the opening leading into the now solid succession of buildings. Behind them they heard and saw strange vehicles, each carrying fully a dozen of the Emites and all bearing down upon them.

"Into this building!" Professor Jameson urged his metal comrades. "We are not caught yet!" The three Zoromes ducked quickly into a broad opening at the base of a near-by building. Inside, huge masses of mechanism testified to their recent guess that they were in an industrial center. Hasty glances showed them that the Emites were still pursuing. 6W-483 talked desperately of making a stand, realizing at the same time its futility unless they could discover a position of advantage.

Through the long, dimly lit factory, the Emites pursued the machine men. At the far end waited more of them, biding quietly. 19K-59 was first to see them in the gloom ahead, and he gave warning.

"There is no way to turn!" 6W-438 exclaimed.

"Here!" The professor suited his thought with action as he climbed rapidly up the incline of a towering piece of machinery. "Up here!"

6W-438 and 19K-59 scrambled after, as the professor paused to repel the advancing mob with his heat ray. This time the heat ray was increased to damaging intensity. One of the foremost of the Emites who clambered in pursuit fell back upon his companions semi-decapitated, a black, charred area marking the recent position of his head. The professor now swung the formidable weapon in a slow circling are as he and his mechanical brethren climbed to a position where it was impossible to go higher.

"Are we secure here, do you think?" 19K-59 asked.

"As secure here as anywhere else until we can manage to reach the harbor and hide beneath the water," said the professor. "We can lose them easily there."

"And ourselves as well," 6W-438 added.

A barrage of gunfire broke out and

a spatter of explosions all about the machine men dazzled them momentarily. With the exception of a mechanical eye destroyed in the head of 19K-59, the machine men suffered no harm, clamping shut their optical shutters until the firing was over.

"They'll find a way yet to subdue us unless we can get safely to the harbor," Professor Jameson ex-

pressed his belief.

"Shall we make a break?"

"Nightfall will soon come. Let us defend this position until then."

During the lull in hostilities, several Emites came pushing their way through the crowd below, evidently being in some authority by the way they were given immediate passage. They came as near as they dared to the foot of the great piece of mechanism and its besieged Zoromes, stopping outside the ring of dead Emites strewn on the floor. They gave vent to unintelligible jargon directed at the machine men, the latter disregarding the sound entirely, concentrating their faculties upon the mental waves of the Emites.

"Ownitelverol has expressed his wishes that you be heard through in peace regarding the denunciations you made against Bemencanla, the Grand Administrator. No harm will come to you during the interview."

This last promise, though temporarily reassuring, was an ominous one. The professor considered, then turned to his metal companions.

"It offers a slightly better chance than this one," he gestured at their present position. "Let us see Owmitelverol and talk with him."

"We can prove nothing," cautioned 6W-438 who yet recognized in this new measure an increased opportunity for escape.

"We can only state the facts

squarely, see what effect they take and then afterward act accordingly," the professor stated.

The machine men were escorted to the Grand Administration Building where they were left under guard. Their interview with Owmitelverol was scheduled for the following morning.

DURING the interview, a murmur had arisen from many throats in the street below, swelling to a roar of excitement and confusion. Disturbed, Ownitelverol went to a window to ascertain the cause of the disorder, aware of the fact that all three machine men were in his presence, leaving none of them responsible for the present tumult in the streets below. Professor Jameson pressed to the window. A huge shape settled slowly into the public square.

"The space ship!" Leaving Owmitelverol still staring out of the window in dumb surprise. the three Zoromes clattered down the innumerable steps and out into the milling crowds of Emites surrounding the space ship at a respectful distance. Recklessly, they pushed their way towards the ship which they were so glad to see once more, especially at such an alarming time. As they burst into the wide opening given the space ship by the awed Emites, out of the ship came a machine man closely followed by several metal companions. It was 744U-21, and behind him came 948D-21, one of those the professor had left at the flooded castle where Kamunioleten had spent his exile. To their surprise and the greater surprise of the already astounded Emites, Kamunioleten himself, smiling and excited, emerged from the space ship.

But this astonishment, though the

greatest one to overwhelm the staring Emites, was surpassed by the
sight which now greeted the professor as five machine men followed in
the wake of Kamunioleten. There
should have been nothing so particularly surprising about them had
it not been for the striving departure in the shape of their heads which
were not at all conical but were long
and cylindrical, rounded on the top
and possessing fewer mechanical eyes
than the usual number encircling the
coned superstructures of the machine
men.

"Where have you been so long, 744U-21?" Professor Jameson queried in open amazement. "And what is the matter with their head?"

"I conceived a better plan after the space ship was less than halfway to Dlasitap," 744U-21 explained, "I took careful calculations as to where the lost projectile with its five Administrators would be and set out to find it The search was more difficult than I had expected, but despite the fact that seven of Dlasitan's years had fled by since the projectile had sped off into space, we finally discovered it. The projectile was still speeding off into space at its last calculated rate of travel when astronomers here on Dlasitap eventually lost sight of it. We found it about forty-six million of vour miles distant from Dlasitap. 21MM392, and still on its way towards the outer planet of this system."

"And these new machine men are the five Administrators?" the professor asked. "You brought them back to life and placed their brains in machines?"

"Yes, 21MM392, even as we did for you once," 744U-21 affirmed. "You will notice that their peculiar shaped brains required a different cranial structure. This took a good share of our time."

"But what of the crew of three who accompanied the Administrators?" Professor Jameson asked. "What happened to them?"

One of the new machine men answered this question himself.

"There was no crew. The crew members were in on the plan to destroy us. As soon as we found ourselves sealed alone inside the projectile and raced prematurely around the wheel we knew that all was not well. We were thrown helplessly into space with all Dlasitap believing that a crew of three accompanied us."

The ensuing excitement on Dlasitap can be well imagined. Bemencanla and several of his cohorts disappeared in some strange manner. In the meantime, a world-wide search was made for the three Emites who were to have been the crew of the fateful projectile. One of them was found, and from him was extorted the proof of Bemencanla's perfidious plot. They also learned that only a day before Bemencanla and his implicated subordinates had entered a projectile for flight to Selimemigre where Bemencanla was seeking refuze.

It was the idea of Professor Jamesson to overtake them and bring them back to justice, and the suggestion was warmly acclaimed by a wrathful world. The Administrators, even ancient Owmitelverol, boarded the space ship with the Zoromes, and off they went in search of the escaping Bemencanla. Kamunioleten showed none of his previous qualms toward interplanetary flight aboard the space ship of Zor. As he remarked to the professor, he felt much safer where he was than where Bemencanla was.

A ND well might he have felt more secure, for with the directions they had been given on Dlasitap by their terrified informant, they quickly found the projectile on its way to Selimenigre.

"We can pick it up with a magnetic attractor," the professor told the Administrators, "and bring it

back to Dlasitap."

"Wait!" cried one of the cylindrical-headed machine men, one of the Administrators who had died a slow, lingering death in the dark, lonely wastes of space. "I have a better way. Why should we not pronounce judgment against him and his conspirators right here and also execute the judgment?"

"What do you mean?" asked 744U-21, possessing only a slight inkling

of the other's design.

"Let us deflect the course of the projectile so that it will be headed into the sun."

Scared faces were dimly distinguishable through the thick windows of the projectile as the space ship of Zor rode alongside and gently bumped the projectile and giving it a mighty push, multiplying its speed by a million times or better. "What would have taken many years will now be accomplished in a matter of less than a day's time," 41C-98 observed to one of the mechanical Administrators.

Leaving the speeding projectile with its doomed occupants heading rapidly sunward, the space ship swerved and headed back for Dlasitan.

Kamunioleten was glad to regain his old prestige and position once more on Dlasitap, yet he declined the offer of the Zoromes to make him like his fellow Administrators

"Let them rule always," he said, "and let my place be filled from time

to time."

The five machine men of Dlasitap were found better content to live an endless life on their own world than to rove among the stars with the Zoromes.

After a brief stay on Dlasitap and Selimemigre, the space ship of the Zoromes once more sped away on its argosy of cosmic adventures, leaving behind two dwindling points of light, one brighter than the other, yet both of which soon disappeared from sight, lost in the distance of interstellar darkness.

THE END



# "By Jove!"

## By WALTER ROSE, L.D.S., R.C.S.

In this installment of our story, our adventurers are still upon the moon Ganumede and their further adventures are told.

#### PART II

What Has Gone Before:

We are told how two adventurers, Seymour Plant and Ronald Service. flying through space, landed on Ganymede, one of Jupiter's moons. They find two distinctive types of creatures there, enemies one of the other. This naturally brings about a species of war and the travellers join forces with one set of the combatant groups, called the Graks. The group with which our travellers have associated themselves naturally are victorious. An interesting feature of the story is the description of the Ganymedians' restricted knowledge of what to us are the most ordinary things. The Grak inhabitants surpass earthmen in other respects. They make two helmets for the earthmen to enable them to see in the dark and to communicate their thoughts by an approach to telepathy.

## CHAPTER VIII

THE DEATH CLOUD

NE day, shortly after he was able to hobble about, Plant greeted me at lunch with the query:

"How would you like to kill a few Krugs, Ronald?"

"I should like it," I answered, "though I should prefer to kill a lot."

Plant laughed. "That will come later. We will start in a small way first."

After lunch I accompanied him to his laboratory, where a number of Crarns and also some labourers awaited us. At a sign from Plant the latter picked up several receptacles and appliances and followed us along the passage that led to the new piece of wall in which the soldier's head had been embedded a few weeks before.

Under Plant's direction one of the workmen proceeded to pierce a small hole through the wall about three feet from the ground. This he accomplished more easily than I had anticipated, being able to soften the cement by the secretion of a thin fluid from his mouth.

When a small hole had been pierced right through the wall, Plant applied his eye to the aperture.

"Good," he muttered. "Take a look, Ronald. There are enough Krugs there for our purpose. It is lucky they always hold on to their conquests."

Squatting I peered into the captured chamber, which sure enough was half-filled with the savage creatures. I could see that they had become aware of our presence and were gathering towards the near end of the apartment, whilst through the opening that had given them access, a continual line of reinforcements was streaming. Evidently they were ex-



High into the air flashed unnumbered legions of flashing wings.

pecting us to make some move that would give them a chance to press home a successful raid.

Having given several of the Crarns time to have a look, Plant next took from a worker a large cement receptacle not unlike a gigantic, somewhat squat tea-pot, in that it had a long spout and a lid. This he adjusted so that the spout projected into the hole in the wall, where it was sealed by a squirt of the ever-useful cement. Raising the tightly-fitting lid of the vessel, which I now saw was three parts full of a white crystalline powder, he poured into it the liquid contents of another container and at once clapped on the lid, which was then sealed down.

"Ten minutes should be enough," he remarked, "but we are in no hurry. It would be just as well to keep them under observation, however, as I want to note the reaction of our scarlet-foes to our ministrations." And he signed to the labourer to make another hole about five feet from the ground. This was soon done with the help of a supporting comrade.

"What are you using?" I queried. "Chlorine I suppose."

"Hydrochloric acid gas," he answered, "I have not yet got a satisfactory oxidiser. The sulphuric acid was my main difficulty, as I was debarred from using a furnace in my laboratory, However I fixed up a small one just outside one of the outposts and managed to distill a little by the old method from ferrous sulphate, I was compelled to start off with something simple and easily prepared at first. Afterwards when I have got a better insight into some of the Crarns' synthetic methods and have collected the necessary materials to prepare a good stock of chemicals, we may do something a trifle less crude, Take a look

and see how they like our little entertainment," he went on. "The spyhole should be well above the heavy gas, but if you get a whiff you had better plug up the hole at once."

I SHALL never forget the sight that met the eye I applied to the hole. Although we later conducted our operations on an infinitely larger scale, this sight of the effects of "civilised" warfare on an unprepared foe, being the first, always remains in my mind as the most grim.

The closely-massed Krugs did not react in the strict sense of the word to the action of the deadly gas. They simply died. They did not gasp, for, in common with those of their hereditary enemies, their bodies were oxygenated through a succession of holes down the sides of the middle segment or thorax. Going on all fours-or rather on all sixes-as they did, these breathing holes were within about three feet of the ground and were soon affected by the vapour that was pouring into the chamber. As they sank to the floor rank by rank, those behind them clambered over the prostrate bodies, to succumb in their turn. Soon the whole of the long, low apartment was paved with a layer of motionless red corpses, over which their fellows still continued to press in from the open ventilator.

As an example of blind, unreasoning devotion to duty, it would have
been sublime, had it not been obvious
that they were but following automatically the dictates of hundreds of
thousands of past generations that
had continually pressed to the attaclagainst a peacefully disposed and
ever defensive foe. I cannot truthfully
say that I had any feeling of pity for
the victims. Their whole appearance,
with their diabolical whitish eyes,

their scarlet bodies, their savage jaws and deadly stings, was too terrifying for one to feel anything but satisfaction at their fate.

When I relinquished the spy-hole to the Crarns, the red stream was still flowing through the opening and the floor was three deep with lifeless hodies

I told Plant of the effect of his experiment and he chuckled. "Good!" he said. "That is better than I had hoped. I was afraid that they might take alarm and scatter, in which case our bag would have been disappointingly scanty. Gas seems to be somehingly scanty. Gas seems to be something quite beyond the range of their comprehension, so we may look for far-reaching results in the future. We can seal up the upper hole and leave them to themselves till to-morrow."

In spite of the cryptic impassivity of the Grak race, it was obvious to us that the Crarns were highly excited over the glimpse they had got of their dreaded foe perishing by hundreds.

impotent and unresisting.

"Truly your powers are greater than we thought, Travellers," they conveyed to us. "Many things has our learning taught us, but never to make our enemies die in masses of their own accord. There is much value in this science of your country. All our skill has been devoted to the means of preserving life, not of destroying it."

"That is what comes of having been denied the blessings of a Christian civilisation," commented Plant bitterly. He had lost his only brother in the first gas attack at Ypres. "Come let us get back to the laboratory, where I have another rod in pickle for our scarlet friends."

Followed by a detachment of labourers laden with a fresh assortment of vessels and materials, we made our way to the ground level and thence out along a passage to the outpost near which we had had our recent encounter with the enemy. No Krugs being in sight, we opened the shutter and passed out on to the yellow plain.

Having posted sentries all around, Plant proceeded to make his preparations. Choosing a hard, fairly smooth area, he gave instructions for several small heaps of fungus cakes to be set down. All around these for a circumference of fifty yards or so he sprinkled thickly over the ground a white crystalline powder.

"It is mercuric chloride, otherwise known as corrosive sublimate," he remarked, in answer to my query. "When these red horrors come to get that food, I think that the result should be quite interesting. We will fix up some little drinking troughs for them at the other side of the pill-box, but I fancy this will be the more effective."

THE reactions of those that commenced to cross the sprinkled area were far more exciting, for no sooner did their feet encounter the crystals than each Krug started savagely to attack his neighbour, until in a few minutes the whole area was covered by a dense crowd of furiously fighting red fends, Whilst this struggle was in progress, many more companies and regiments arrived hurriedly on the scene, only to be themselves involved in the grim internecine hattle.

It was only when the whole area was so carpeted with torn bodies that the corrosive sublimate no longer came in contact with the fresh arrivals, that the slaughter ceased. By this time the water in the troughs had been consumed and the dead lay round them in heaps. "It reminds one of the story of Cadmus and the dragon's teeth," I remarked, "But why did they attack one another in that manner?"

"Your analogy is singularly apt," replied Plant. "The mercuric chloride burns their feet and they attribute the pain to their nearest neighbours."

Next day the spy-hole into the death-chamber was opened and so high and so tightly packed were the bodies inside that nothing could be seen. Larger holes were then made through all three doorways at the level of the roof and two days more allowed for ventilation before they were opened. By this time most of the gas had disappeared. So persistently had the attackers pressed one upon the other in their blind efforts to reach their unseen foe, that we counted 600 Krug corpses on the way to the drying rooms and there were signs that scores more had perished outside the ventilator and fallen into a deep gully below.

"A merest drop in the ocean compared with their vast hordes," commented Plant, "But very useful as a demonstration of the resources of civilisation. Now we are in a position to bargain with our hosts."

The negotiations were simpler than we expected, thanks to the flex-ibility of mind given to the Crarns by their unconfined brains. We were thankful that we had not to deal with professional soldiers who would sooner lose a hundred thousand men by the established rules than gain victory by "new-fangled methods."

The savants saw at once the value to them of the proposed alliance and readily undertook the suggested cooperation. They had already tested and analysed the scraps of plantite and thought that in time they would be able to produce a compound with the required properties.

Plant then broached to them his suggestion for striking a crushing blow at the Krug hordes, which was nothing less than to take advantage of the next ritualistic flight, or Quireek as it is termed in the nearest our tongues and spelling can approximate to the Grakan creaks. This occasion he proposed to utilise to the discomfiture of the enemy hosts by arranging for each filer to carry a thin and easily-broken vessel of a liquid that on exposure to air would at once volatilise into a deadly vapour and exterminate all within its range.

"Hydrocyanic acid should do the trick," he remarked to me at the same time conveying the underlying thought to the Crarns. "It will be at ticklish job to make and we shall probably have a few casualties, but all the ingredients, hydrogen, carbon and nitrogen are procurable in unlimited quantities and I am sure that the Crarns will be able to synthesize them, so we had better decide on that. We can also fix up some HCN gas apparatus to use from the outposts."

"But will you not have to secure the cooperation of all the Grak cities?" I asked. "That will be a colossal task to undertake, especially if they allwant a demonstration."

"Obviously such a thing would be utterly beyond the range of possibility," he agreed. "We can, however, arrange for our own Crarns thoroughly to master the whole idea and process of manufacture. With master-minds such as theirs there will be no difficulty about that. They can then send deputations to reach as many communities as possible. Luckily, although the main mass of the propose is completely indifferent to

the interests of their fellow Graks of other congregations, the Crarns seem to be receptive of a less parochial outlook, so there is a chance of instituting something approaching combined action."

"By Jove!" I cried, making Plant wince slightly at this entirely innocent repetition of my former pun. "What a stupendous idea. One might almost imagine it as the basis of some fantastic varn. Two men coming from the earth to organise the inhabitants of a distant satellite against the oppression of a million-year-old tyrannv. The white man's burden in excelsis. What!"

We had kept on our headgear during this conversation, as we wished the Crarns to follow us and to realise that we had nothing to conceal from them. It was evident from the thoughts that they sent back to us that we had aroused their keenest interest. Enthusiasm of course we did not expect from these unemotional creatures.

And so it was arranged.

BATCHES of these trained intellects were very easily instructed in what after all were matters of very rudimentary chemistry. These were dispatched to adjoining communities. where they were to give demonstrations of the effects of poison gas and instruct further batches of disciples. We calculated that within a month or so the greater majority of the whole nation would have learnt of our plans concerning the use to be made of the great flight and of our proposed further campaign.

Meanwhile thousands of labourers were set to work on the thin cement receptacles which were to contain the lethal fluid, samples of which vessels were carried by the Crarn emissaries. So far Plant had been severely handicapped by the fact that he was denied the use of fire in his experiments from the surprisingly inflammable nature of the vessels and of course of the whole artificial mountain. thought of what would happen if this colossal aggregation of combustive multi-storied cities with their hundreds of millions of inhabitants caught fire, was so appalling that we never ventured so much as to strike a match until-but I must not anticipate.

Plant was in hopes that ere long he might be able to discover deposits of asbestos or some similar material. that would enable him to construct a fireproof workshop in one of the outposts and commence to smelt out from their ores some of the numerous metals of which he had found evidence, some of which he was convinced were quite unknown on earth. I may remark here that even in the short time afterwards at his disposal he discovered several entirely new elements of very considerable interest to chemists and physicists.\*

## CHAPTER IX

## THE GREAT LIGHT

TEADILY our preparations for the Quireek went on, I write "our" though as a matter of fact I played only the part of spectator, and it was not long before Plant

\*In addition to Nigron, which I have already men-tioned, the most notable of these new elements were Jovine a volatisable shiny black solid with the atomic number 95 and a radio active alkali metal, No. 97 in the periodic table. This latter Plant paid me the com-pliment of naming Servium. The former exists on Ganymede in the form of several mineral salts, known as jovides and jovates, several of which promise to be as joyaces and joyaces, several of watch promise to be of distinct commercial value. Servium was found mainly in the form of carbonates and chlorides. Plant is devoting two full chapters of his book to this subject. See "The Jovian System from Within" by S. Plant.

left all this routine work to our allies and gave his undivided attention to further experiments and cautious explorations in an endeavor to procure as full a knowledge as possible of the chemical resources that were available on our part of Ganymede. In this he was actuated partly by a desire to find fresh aids to our warfare with the Krugs: partly in order to obtain the ingredients necessary for the manufacture of plantite and partly by that love for investigation of the unknown that characterises the true scientist. This I could readily appreciate, for though my knowledge in the matter of my own hobby was relatively much inferior to Plant's in his. I always regard the year I spent amongst the Graks as the most interesting and worth while of my life.

Jar after jar was made, tested, filled with the death-dealing fluid. hermetically sealed and carefully stored in the calleries and chambers through which the winged hosts were to pass on their way to the outer air. Gradually news reached us that the work was progressing satisfactorily. first in scores, then in hundreds and finally in thousands of other communities. It was not our intention to allot a jar to each flier. That would have been impracticable and quite unnecessary, as one jar to every hundred square vards or so of surface would be ample for our purpose. This would in theory be achieved by allowing one to every fifty fliers.

Soon the galleries began to be filled with the neophytes, their beautiful shining wings folded over their backs,\* walking restlessly up and down, waiting for the hour for which those wonderful wings had been produced, the hour of release, the hour of liberty—and death.

That the Krugs from age-long usage were well aware of the approaching holocaust was evident, for from our window we could see them gathering on the open ground, until from the foot of our cliffs halfway to their own distant stronghold and on either side as far as the binoculars could make it visible, the plain was one uniform vermilion colour.

So far I have represented our region of Ganymede as consisting of Grakok, the great range of artificial mountains in which the Graks lived. opposed ten miles away by Krugok, the smaller range that the Krugs had captured some twenty thousand years ago and now inhabited. This was all that had so far come within our range of vision, It must, however, be understood that the Grak empire-I am compelled frequently, for want of better expressions, to use terrestrial words that do not represent exactly the conditions-was completely ringed in by its enemies and stood like a huge puce island in a saffron sea. Fronting its other faces were numerous other strongholds, much inferior however in size to Krugok, and which had been captured by the Krugs in still earlier ages.

As will be inferred and as we afterwards ascertained, the vast expectant
hordes completely ringed the whole
mountain empire with a living vermilion wall. This had an average depth
of five miles and a very rough calculation, allowing four square yards for
each Krug, will give the appalling
total of over a thousand million enemies. This must have been practically
the whole Krug population of the
planet, allowing for those of neces-

<sup>&</sup>lt;sup>4</sup>A nearly complete pair of these wings is now on view in the insect room of the South Kensington Museum. Unfortunately the tips, especially of the latone, got somewhat bedly damaged during our homeward vorage.

sity left behind to attend to the care of the eggs and young.

Silently they stood-mercifully Krugs are practically mute-all, as far as we could see, with their horrible whitish eves directed towards our citadel; whilst inside, the neophytes thronged the passages by scores of thousands waiting for the morrow, the great day of their short lives.

IT had been arranged as an elaboration of our plan, that, at the time when Juniter showed as a two-thirdsfull moon, just prior to the chosen day -this would be about fourteen hours before the Quireek which always commenced at sunrise-from all the outposts that were so prepared a preliminary wave of hydrochloric acid gas was to be sent out in such quantities as the strength and direction of the wind made advisable

We were assured that, however great the slaughter that might result from this measure, it would do naught to abate the frenzied eagerness of the ravening hordes nor cause them to disperse from the scene of the seon-old sacrifice

As the hour approached I stood with Plant and some of the leading Crarns at the window of our room looking out on the vast scarlet concourse, whilst overhead the great vivid-hued part-orb of Jupiter sent down his rich silvery light. Near to him, a blue half-disc, his lesser consort. Io. approached her transit and low on the western horizon Callisto glowed like a ruby lamp.

Although the Krugs surged along the base of the cliff, they made no attempts to climb it to explore for chance openings, as was their usual custom. I questioned one of the Crarns about this, suggesting that

there was a danger that they might seize the opportunity afforded by the opening of thousands of windows to make an irresistible attack on the citadel. His answer was that they never did so, as they knew as long as they remained near at hand every crevice would remain tightly closed.

"They are content to wait for the sacrifice that they know will be offered," was his dictum.

At the hour, as I scanned the wait-

ing throng, I felt almost a feeling of regret that we had decided to take such an active part in this ancient rivalry in which our only personal interest was the plenishing of our vessel for a return flight. What right had we. I asked myself, to interfere and take sides in an age-old duel in which a very good plea might be made out on the Krugs' side? By what authority did we assume position of divine arbiters on the destiny of a planet? Now that the hour was at hand, the idea of wholesale slaughter appeared far less inviting than on the first proposal of the scheme.

Then I took a glance at a small bunch of graceful neophytes clustered near the entrance to our room. My eye took in the dainty unprotected pink bodies, the delicate limbs, the beautiful large eyes with their youthful look of eager expectancy-the only sign of emotion I ever saw on Ganymede-and the iridescent gauzy wings. I looked again from the window at the savage, scarlet throng waiting to glut their appetite on the tender quivering bodies.

By some curious association of ideas my mind traversed nigh 2000 years of time and 500 million miles of void to the Tiberian horrors on the Island of Capri, and my scruples vanished, nor did they ever again return.

"There they go," cried Plant inter-

rupting these musings and pointing to one of the more distant outposts nearly a mile away. I followed the direction of his finger, and saw that from the puce-hued mound a billowing cloud was pouring out across the yellow plain and across the scarlet hosts that thronged it.

RROM scores of others as far as we could see rolled similar clouds, showing that our immediate neighbours at any rate had learned their lesson well. The effect was immediate and terrible. Wherever a cloud of the deadly vapior struck a detachment of the white-eyed carnivores, they went down like cornstalks before a sickle and where they fell there they lay.

Wider and wider grew the circles of death, thicker and thicker lay the heaps of scarlet slain. Perhaps the grimmest detail of the grim scene was that the living made no attempt to escape the death-cloud, but rather pressed forward over the fallen ranks to a position nearer their expected prey, only to fall lifeless across the bodies on which they trod

For upwards of a couple of hours fascinated, I watched this scene of carnage, till Plant again directed my thoughts into other channels.

"Come, Ronald," he cried, "it is time for supper and then to bed. The sun is due in less than twelve hours and we will have a pretty exciting day tomorrow."

We woke two hours before sunrise and went at once to the window. The white clouds had long ceased to pour forth from the outposts and had been swept away by a stiffish breeze. With our glasses we could see no sign of dead Krugs. These had evidently been dragged away or devoured, for colossal as had been the slaughter, it had accounted for but a fractional part of the whole array, which appeared to have been augmented rather than diminished.

All chambers and galleries adjacent to the exterior were now thronged with the winged hosts, their slim pink bodies trembling with excitement at the prospect of their imminent release. Lines of the city soldiers, or police. kept them in orderly array and amongst them passed thousands of labourers laden with the thin earthern vessels, which at the last moment would be handed to the stoutest amongst the eager neophytes. Lest any jars should be prematurely dropped with disastrous effects to the wrong parties, a cement ring had been attached to each, which was to be forced over the second joint of the flier's arm

No instruction could be given; for these poor, ephemeral creatures were quite destitute of receptive faculties and of course of experience. With a thrill I contemplated how in thousands of adjoining cities the same scene was being presented, the same expectant myriads of sacrificial victims, the busy labourers with their deadly burdens, the emotionless intellectuals, the impassive police and, at each shuttered opening, the detachment of warriors whose duty it was to open the way and to prevent a jamming of the exits by the too eager youngsters.

Only in this one city stood two nervously waiting men from a planet barely visible to the naked eye, who had rashly planned to change the course of history on a world 500 millions of miles from their own birthplace.

WATCHES in hand, we faced the distant Krug stronghold across which the first rays of the rising sun

would gleam, some 50 minutes after they had left their source. Already on the tops of our own range the silver shine of Jupiter was being suffused with a warner glow, as a maiden's cheek incarnadines at the approach of her lover. A restless stir of expectancy swept across the watching multitudes below, as when the morning breeze passes lightly across a field of ripened grain, the murmur of a myriad joints flexed in crouching expectancy.

Then on to our faces shone the rays of the sun as he gleamed forth with a twenty-seventh part of his earthly power across the eastern plain.\* The hour of the Quireek had struck. Throughout the vast empire of the Graks, millions of openings were unshuttered, hundreds of millions of winged neophytes burst forth to greet the sun, bearing aloft the lethal vessels that were to make this Quireek differ from scores of thousands of former flights; for instead of being an occasion of blind, meaningless immolation, it was to be a decisive blow in the campaign to free a world from an age-old tyranny.

High into the air flashed unnumbered legions of flashing wings\*\* as the circling hosts wheeled and swooped, soaring and circling, with a sublime ignorance of their speedy and inevitable doom; whilst below them the ravening hordes raised their sickle-jaws aloft as if to snatch their tender prey from the sky itself. Now the sound that reached our ears was more than a rustle, for the combined noise of millions of hungrily clashing jaws was like to the roaring of breakers rolling up a pebbly beach before the urge of a gathering gale.

Still the winged host kept wheeling and whirling, their gauzy wings reflecting with a thousand combinations of the rainbow's hues the dual lights that shone upon them.

Then like Lucifer from Heaven, a fragment of the rainbow fell to earthward about two miles from us. I had the glasses, and levelling them I saw the eager rush of the Krugs in the vicinity. I saw too the instantaneous collapse of the nearest and marked how those to leeward of them collapsed likewise as the deadly fumes reached them, until a wide swath had been reaped by the scythe of Death amongst the crimson host.

And now thick and fast fell the living gas-shells. As far as the range of our binoculars permitted we could see the iridescent flashes and mark the scarlet ranks sinking in rhythmic waves before the toxic HCN (hydrocyanic acid.) The success of the experiment was stupendous and terrifying in its completeness. Even the unemotional Crarns stood spell-bound at the grisly holocaust of the dreaded foes.

"Truly the power of your science is great, Travellers." came the message of their leader to us.

Plant looked at me. His face was white as death and shiny with sweat. I expect that I looked the same. I know that I wanted to vomit.

"Well, Ronald, our experiment was a complete success. As a source of danger the Krugs have ceased to exist," he said laying a trembling hand on my arm. "I expect I am the first person in history who has killed even indirectly. a thousand million living

<sup>\*</sup>Throughout we used earth's cardinal points, east for the point of sunrise, west that of sunset, north to our left and south to our right when facing east. Actually our compass pointed SSW by W. Plant has gone very carefully into this matter in his book "The Jovian System from Within."

R.S.

<sup>\*\*</sup>Those who were to depart from the apertures facing west would of course be freed somewhat later. R.S.

creatures of his own size in one day."

"C-c-congratulations." I stammered, "I expect you are. I say, Plant, haven't you been able to make some decent whisky in that laboratory of yours? I never needed a drink more."

Plant forced a somewhat sickly smile and reached out for a cement bottle that stood on the table, together with some drinking cups.

"I anticipated such a need by both of us. I don't guarantee it is whisky. I I made it by fermenting a sort of syrup made from the fungus and mixed in a few other things. It seems to have a bit of a kick." and filling two cups he handed me one.

"Well here's to the regeneration of Ganymede," he said raising his cup.

"And a safe return home for its regenerators." I rejoined and clicking mine against his I took a mouthful, "You are right about the kick." I gasped, coughing and wiping my eyes. "It is almost a pity that the name plantite has been bestowed on your other explosive. Anyhow it has saved me from undignified collapse." And I took another more cautious swig.

The Crarn leader had been closely taking in all this by-play. Pouring a little of the liquor into a third cup, Plant offered it to him. He took a drink, then another.

"Truly the power of your science is great, Travellers." he repeated. Then, carefully setting down the cup, he collapsed on the floor, blind drunk. Two of the attendant labourers calmly lifted him, placed him on Plant's stretcher and carried him away: we hoped not to the drying rooms.

It was an absurd anticlimax to a day of colossal tragedy and sinking doubled up upon our couches, we laughed and laughed and laughed.

### CHAPTER X CLEANING UP

LTHOUGH we had a full might's rest, such had been the the strain and excitement of the last hours—the kick of Plant's "white mule" may have contributed—that we slept for four or five hours before we roused ourselves. Our heads were a bit muzzy, but a cold plunge and deep draughts of water soon freshened us up and we ate heartily of our fungue cakes.

By common consent we had not approached the casement, which, as a precaution against any vagrant breaths of poison gas, we had kept tightly shuttered; but now our natural curiosity supervened and we took a look out across the gristy plain.

And what a sight met our gaze. Where a few hours earlier had been a hundred-fold the vastest congregation of life on which the eye of man had ever fallen, now lay stretched, in silent rows, clusters and masses, the largest accumulation of dead bodies that the mind of man has ever conceived of. From the recesses of my memory came some half forgotten line of poetry.

The earth is covered thick with other clay

Which her own clay shall cover, heaped and pent

Rider and horse,—friend, foe,—in one red burial blent

Red indeed was this stricken field, the vermillon forms of the Krugs inextricably mingled with the pink ruins of the winged host, that had seen the day of its expectation open in a golden glitter of hope and set in a red ruin of extinction. With the glasses we could see amongst the nearer groups the pitful bodies twisted into every manner of fantastic attitude amongst the deeper scarlet slain, the rainbow wings that had flashed so joyously, crushed and smeared, the limpid eyes that had glowed with eagerness now dull and white as those of their foes.\*

It was a terrible yet, in a strange fashion, a majestic sight. I turned to Plant and toyed with the impressive thought that the brain behind that impassive and somewhat pallid face had been the cause of this vast hecatomb. It seemed impossible, grotesque, almost terrifying. Then came another thought. What were the Krugs after all in their swarming millions but a kind of gigantic, excessively ferocious insect?

Would we not regard a man who devised a method, however ruthless, of destroying the swarming billions of house flies that infest the earth, or who would rid the world say of the Colorado bestle or the locust at one sweep, as a public benefactor? Would not the Australian Government reward handsomely any inventor who could bring about similar mass slaughter of the rabbit, higher in the scale, warm-blooded and individually peaceful as it is? A truce to maudlin sentimentality.

"What about the problem of decomposition?" I asked. "Will not the stench be insufferable? The Graks can never cope with all that lot."

"I do not think there will be any trouble on that score. I have already thought of that and have made a few tests. I find that a Krug body consists of less than 17% of water compared with the 73% of our bodies and 62% of the Graks. This is probably the result of the long ages of drought from which they have suffered. In this excessively dry atmosphere, a few hours will see them completely desiccated and mummified and in a few months the whole lot will be reduced to powder."\*\*

THE next days were busy ones, for we had decided to do nothing less than to destroy, the Krug strongholds throughout the whole country, before the immature young should have time to become adult and thus make our task more formidable.

We decided first of all to tackle Krugok, leaving the smaller congregations on the west to the communities on the other side of Grakok. Our preparations were simple but effective. Having decided that we should make poison-attacks the keynote of our campaign, our first problem was to devise some means of transporting gas-generators of the necessary size and number.

Now although the Graks are in many respects skilful mechanics and engineers, mainly in the lines of building and ventilating, curiously enough they have no knowledge of many of the chief mechanical forces in use on earth, such as the lever, the wedge, the screw, the pulley and the wheel. It was with the last of these we were now chiefly concerned for we proposed to construct a number of large, low trolleys to transport our annearatus.

The wheels, which were of small diameter with very broad treads, were made easily enough by running

<sup>\*</sup>It is a curious point that the eyes of the Graks, which are lidless, though normally of so deep a purple as to appear black, assume in death a dull white colour with the faintest tinge of blue. I can give no reasonable explanation of this phenomenon.

<sup>\*\*</sup>He was quite correct. Even before we left, this pulverising was well-advanced. Such was the number of the slain here and on our subsequent clearing-up campaigns, that tests of Ganymede's atmosphere made later showed a distinct increase of moisture.

quantities of the ever-useful cement mixed with small stones into moulds cut in the hard earth of the plain. Freed from the Krug menace as we were, our preparations could now be carried out in the open. True, many thousands of Krugs had survived the great killing, saved by some vagaries of the wind, but these had returned to their strongholds, no doubt laden with as much of the plentiful food as they could carry.

The bodies of the trucks were similarly constructed and mounted on the wheels-six to each vehicle-by somewhat crude but efficient axles. With hundreds of thousands of busy workers at our disposal; workers, who once instructed in a particular method would carry it out efficiently and almost automatically; the work proceeded apace. As fast as instructors could be sent to them, other cities, the first reluctance towards co-operation having already been overcome, followed our example, making trollies, mounting on some of them the giant generators and loading others with supplies of chemicals, food and water.

These later generators were of an improved design, which allowed the acid to be dribbled upon the salt by degrees, something after the style of an ordinary acetylene lamp.

In three days the expedition was ready. The sun had again set after his 85 hour visit but Jupiter was approaching his full, and the visibility was as good as on many terrestrial days. More important still the wind was favourable, being from the west. With a great creaking of unlubricated axles, we set out across the plain in hundreds of columns. In front of each marched some thousands of labourers to clear a path through the dried

corpses, ready if danger appeared to retire behind the strong bodies of soldiers, that followed close upon them. Then came the generators on their trollies each drawn by fortyeight labourers with twelve more pushing behind. Behind these came the supply vehicles similarly propelled. Bringing up the rear was another strong detachment of warriors.

Plant and I marched at the head of the vanguard, our binoculars in constant use. With us and accompanying each generator were a few of those Crarns who had become specialists in gas warfare and whose office it was to prevent any disastrous release of the death cloud when the direction of the breeze was unsuitable. As will naturally be surmised, numerically large, though comparatively insignificant casualties occurred on our side throughout all these operations, the greatest being the almost complete annihilation of the inhabitants of one city owing to the ill-calculated fragility of the HCN (hydrocyanic acid) jars constructed therein.

Also during our clearing-up campaigns, several times columns of Graks were surprised by overwhelming forces of Krugs advancing down wind and were either cut to pieces, or perished by the despairing release of a lethal cloud from generators to the windward of them. The worst of these set-backs occurred on the western sphere of operations at the other side of the Grakan mountain and involved the complete extinction of a army of over half a million, Marathon of the nth degree.

As we approached the edge of the crimson death-belt, we could discern a thin line of Krugs journeying to and from their stronghold, evidently carrying off as much as they could of the rich store of food—friend or foethat lay there for the taking. At sight of us they fell back towards the great row of artificial mountains they inhabited

These, as we neared them, we found to be considerably inferior to the range we had left, attaining a maximum height of less than 2000 feet and a visible length of about fifty miles. At the time of its capture the disparity in size had been less, but the Krugs had added nothing to the structure since that day, whilst the Graks had been continually extending the size and number of their group of cities.

About midway between the two great artificial ranges, we crossed a natural depression in the ground, over four miles wide and extending as far as we could see. This we learned was the bed of the last stretch of water that had existed on the surface of Ganymede and was the reason for the two empires then surviving becoming the last refuges of the Grak race.

Here generation after generation had they been unceasingly besieged by the well-nigh drought-proof Krugs, until at last ages back the empire named Krugok had succumbed and its whole population had been slaughtered and devoured. But for our intervention, it is practically certain that sooner or later the larger stronghold would have been similarly overrun.

When we were about two miles from our objective we saw several large scarlet patches at the base of the mountain citadel, which through our glasses resolved themselves into regiments of the enemy drawn up in martial array. To right and to left extended these armed masses as far as we could see, and, issuing from numerous doorways of the huge stronghold, thin crimson lines were streaming to join the main bodies. Evidently our savage foes meant to resist to the last. Such ideas as surrender, mercy, truce etc. were utterly unknown on Ganymede. For untold ages the law had been, fight till you die, kill or be killed, eat or be eaten.

CONFRONTED by this last imposing display of martial force, the order was given for the generator trollies to advance in extended line instead of in columns, the armies to either side of us following the example.

Having halted for an hour to give the order time to be followed by the extreme flanks and also for every available Krug to assemble in the open, the whole vast line commenced slowly to advance, the cumbersome vehicles groaning and shrieking on their unlubricated crudely-fitted axles.

From a point of vantage it must have been an impressively majestic and colorful sight. The long vermilion ranks drawn up at the foot of their brownish purple mountain fortress, across the saffron plain the advancing regiments of purple warriors, followed by the detachments of grevhued labourers dragging the laden trucks, also purplish in tint, followed by more masses of purple soldiers. Above glowed great Jupiter's multicoloured disc, nearly full and attended by Europa's great blue ball and Callisto's ruby lamp. Certainly no human, indeed no mortal eye, has ever beheld such a display of martial force and colour, nor will again.

Slowly we advanced. Steady in their ranks the Krugs awaited us. At last when but half a mile separated the two forces, in absolute and perfect unison the scarlet lines charged, as if to sweep from the plain the presumptuous opponents who now defied

the might before which they had so long bowed.

Instantly our whole line resounded with whirrs and creaks and whistles as the purple advance guard retired behind the line of gas-generators, marshalling to their rear the trucks' hauling teams. Steady at their posts stood the Crarn operators, ready at the right moment to let loose the death-cloud.

Rapidly and in perfect order the serried scarlet ranks advanced, their eyes gleaming with diabolical malignity and expectancy. They were within two hundred vards of us. A hundred and fifty. We fidgeted impatiently. A hundred. And now from our whole long line the white fog-poured forth and rolled towards the red that ran to meet it, to be enveloped by it, But not entirely. Something is wrong with a generator on our right and there is a broad gap in our gaseous defence. Into this gap charges a full Krug regiment some twenty thousand strong. In a moment they are over the trolley, the Crarn operators are ripped up like bags of meal, the purple soldiers are hurled back by sheer weight of numbers and in less than a minute the scarlet savages are rinping and slashing amongst the defenceless trolley-haulers. Excitement, some atavistic impulse maybe, seizes me.

"Come on, Plant." I cry and dash into the melee.

A Krug opposes me and my club dashes him to the ground, another crumples up, broken asunder in the middle. Three more share their fate and I find myself surrounded. A sting glances harmlessly off my leg-guard, horrible white eyes glare into mine and slashing jaws menace me. I strike down the nearest. Before I can lift my club another is upon me. My breastplate meets a crashing blow that splits it across and drives me staggering back. The monster leaps forward to complete his triumph, his eyes glowing horribly. Suddenly eyes, jaws and head are crushed down into the body by a club that sweeps past my shoulder.

"Up here, Ronald, Quickly!" comes' Plant's voice as from another world, as, grasping my arm, he hoists me like a rag doll up on the generator truck against which I had been forced.

"Thanks, old man." I gasp. "That makes us quits."

"Keep your breath." he retorts. "Here they come again."

For a time however the advantage was with us. Our elevated position, safely above the reach of the deadly stings and giving power to our downward blows, the generator at our backs, and the strength of our earth-trained muscles, all helped to make what followed a matter of systematic and almost monotonous slaughter. And here our very success nearly proved our undoing.

As the Krugs advanced so they fell and as they fell so fell others upon them until the mound of bodies was flush with the bed of our pedestal and we again faced the attackers on level terms.

"They'll get us yet." I panted.

"We can't stay here much longer, that is certain," gasped Plant. "Our only chance is to try and break through them. Ready? Then come on." And together we leapt to meet the foe.

One, two, three I struck down and I could hear the crunch of Plant's club close behind me. Again almost automatically I raised my club aloft, then dropped it. There was nothing more to strike. The red ranks had

given place to purple. The reinforcements from either side of the breach had arrived, the salient was closed and the invaders annihilated.

METHODICALLY and unemotionally our rescuers proceeded to clear away the heaped-up dead from the recaptured truck, a couple of Crarns started to adjust the faulty acid-feed and the incident was at an end. We learned later that many similar breaches had occurred along our front of over fifty miles, the estimated losses being in the neighborhood of three hundred thousand.

Meanwhile, what of the main attack? Wind-borne the deadly vapour swept on; it had already reached Krugok and lay billowing at its base, too heavy to enter any but the lower openings, and still the scarlet foe before us remained concealed. The flow of acid in the generators was shut off and our whole line halted in its ranks.

Soon the breeze cleared the air in front of us and we could see the long red lines now within fifty yards of our position, but no longer awe-in-spiring in their utter ferocity, but still and harmless in the peace of death. Rank after rank lay revealed to us as the lethal vapour was swept away to be piled by the wind higher and higher up the towering fortress. All were for ever motionless, an army of corpses. As far as the eastern sphere of operations was concerned, the Krug armies had ceased to exist.

## CHAPTER XI A MOUNTAIN PYRE

FOUR days we left the gas clouds to dissipate and in part to permeate the honeycombed citadel, before we thought it safe to approach more closely. Meanwhile we returned to

our city and from it continued our exploration of such of the country as we could reach without running unnecessary risk from stray bodies of Krugs. Especially keen were we to obtain as full knowledge as possible of the mineral resources of Ganymede in the hope that we might have The Comet ready by the end of the terrestrial year, when the most favourable conditions for a return journey would prevail. Many hours also Plant spent in his laboratory in consultation with the Crarn chemists, in an attempt to find a way to manufacture plantite, or alternatively a satisfactory substitute.

We were impatient for a chance to make a longer excursion, extending for weeks if need be, as we were convinced that the whole surface of Ganymede could-not be one huge yellow desert with merely artificial mountains, but were sure that, and at no insurmountable distance, there must exist ranges of natural mountains that would offer infinitely greater chances of mineral discoveries.

The Crams had no knowledge of any such ranges, but that was not surprising as their inexplicably-retained traditions dealt only with facts directly concerning their own past and probably they had never been a mountain people. So might the people of ancient Babylon have been ignorant of the mountains of Armeia

The fifth day after our last blow at the Krugs, as the sun rose again across Krugok, a fresh breeze from the west sprang up and decided us to continue the campaign. Across the plain we set out again, through the heaps of desiccated dead, across the old lake-bed to where a nucleus of the attacking army had remained fronting the scarlet army of the dead. A full ninety-five per cent had returned to their cities, as no further danger was anticipated. Giving the signal toadvance, we started off towards the rising sun, over the prostrate bodies, right to the foot of the retreat they had sought so vainly to defend.

Well-guarded by warriors and sniffing the air as we went, we started the ascent, the main army halting on the level. At the first opening we came to, we took a half dozen soldiers and cautiously entered, having first adjusted our visors. Confident in their security from attack the Krugs had never closed these apertures, and the doors had fallen into disuse. As we proceeded we came across an occasional red corpse, showing that the gas had permeated some parts at least of this retreat. Also we found thousands of a smaller type of Krug such as we had not yet seen, pale yellow in colour and with jaws of the size possessed by the Grak nurse-domestic class.

One large chamber we came to was half-filled with eggs about the size of a turkey egg, but membrane-covered like those of a snake. Other chambers contained part-developed young in all states of growth up to the well-nigh full-grown but still helpless, deeppink stage, which precedes the final hardening of the integument into the smooth vermilion armor of the adult. Those on the lower levels were all dead, but higher up above the death zone, we found them alive in thousands, in scores of thousands; taking into calculation the whole community. in scores of millions; white eggs, pale pink infants and deep pink adolescents, tended by multitudes of yellow nurses, who rushed apparently panicstricken to and fro, dimly conscious that all was not as it should be, yet lacking the mentality to grasp the is-9110

66YE GODS!" exclaimed Plant.
"What are we to do? It would
be the work of years to clear up this
interminable nursery, meanwhile
these pink horrors will be sitting up
and taking notice."

"The trouble is that our soldiers will not be of much help except to kill them off as they develop. You can see they are not interested, Millions of years have impressed on what minds they have, that all enemies are red. Things like this they have never seem."

This was undoubtedly the case. Never having raided an enemy city, the Graks showed no martial reaction at the sight of the pink wriggling masses. As we left the great chamber, we encountered a fully developed juvenile that, having just attained to full vermilion Krughood, was testing his unaccustomed limbs in the passage. Instantly one of our bodyguard stepped forward and slashed the still unhardened body in two.

"You are right," commented Plant "but what are we to do? We can't wait till they mature and then kill them off one by one, neither can we get our generators up the steep slopes outside to a level that will enable us to gas them."

"Come on, let's get out of here. These squirmy little frights are getting on my nerves," and I led the way to the nearest exit.

Back with the main force, we held a consultation with some of the Crarns, but they were not able to help us. The whole business of absolutely exterminating an age-old enemy was beyond their range of possible contemplation and they had no helpful suggestion to offer.

Automatically, as I often did when thinking deeply, I reached for my cigarette-case, which all these months had lain undepleted in my coat pocket, so seldom had been our opportunities for smoking.

As I offered it to Plant, he gave a sudden laugh. "Well of all the slowwitted asses, we are the limit," he cried.

"What is up now?" I asked quite at sea.

"Why, man, don't you see? Your cigarettes. Why are they not all done?"

"Because we have had so little chance to smoke that I have almost got out of the habit. Had it not been for the continual danger of setting our home on fire . . . . Ye Gods, you mean . . ?"

"Yes, of course I do. What else?"

"Ye Gods!" I gasped again, appalled by the sheer simplicity of the whole terrible idea. "Well carry on, we may as well be hung for a sheep as a lamb. What after all are a hundred million baby Krugs? I only hope their spooks won't haunt me all at once. Lay on, MacDuff, I'm ready."

Our preparations were soon made. The main mass of the artificial mountain was too hard and solid for the implements we had to make any impression on it, so an empty generator was broken up with a few hefty blows of our clubs and the pieces stacked in a loose pyramid just within the entrance of the nearest doorway. Striking a match Plant held it against one of the thinnest pieces and jumped back as a great vellow flame shot up. We did not pick our steps but reached level ground in a couple of huge leaps. Luckily the wind was blowing strongly from the plain, or, not only we, but probably the whole of the Grakan forces would have been scorched to death by the huge sheet of roaring flame that leaped skyward as

the vast inflammable mass took fire.\*

**\*\*B**ACK, back for your lives. Leave the machines." We shouted and signalled to the waiting throng, setting the example at full speed. We certainly-had not expected anything as rapid as this.

It was an amazing example of ingrained instinct to see the long lines of purple warriors in full retreat, walking rapidly backwards.

To right, to left and skyward leapt and roared the bright yellow flames. To right and left the whole army retired in their ranks. Here and there a single soldier, here and there a whole company fell prostrate before the fiery breath of the devouring monster we had unchained. On our flanks, the Graks, being quite ignorant of the properties of fire, suffered enormous casualties before our passed-on warning could be transmitted and acted upon.

One by one the abandoned generators with their trucks shot up in sheets of explosive combustion and even the fallen bodies caught fire.

How we blessed the strength of the westerly breeze that alone saved us from swift incineration as we ran for safety.

Two miles out on the plain, we halted to take breath and watch the utterly terrible spectacle. Eight days earlier we had been the witnesses of a

<sup>&</sup>quot;Sample of the cemented building material that we hrought home, have been analysed by SI Joshus, Sikhind, the well-known chemist. Except for the following the properties of the properties of the found that it consisted of an unknown material cleave; resembling pyrocylin in its properties to which be gave the mane of Graklet. It would seem that by agree the mane of Graklet is would seem that by the Grak labourers have the power of characing the molecular construction of the vegetable and other organic matter they swallow and of exceeding it in fammable common moderfully hand and extremely infammable common forms.

hundred fold the most colossal slaughter that the eve of man has seen, now we beheld a hundred fold the most devastating fire that any human being has ever witnessed, and both the outcome of our plans and acts. Extending right and left for mile upon mile, ten thousand feet the roaring flames leaped aloft as if to scorch impassive Jupiter himself.\*

Even where we stood the heat was intolerable and we continued to retire to Grakok, where from our room we watched the mighty spectacle, hour after hour, fascinated and enthralled.

"Truly the power of your science is great, Travellers," sounded a voice in our brains. We turned round. Behind us stood the leading Crarn, his snail-like eyes directed towards the cement bottle on the table.

Plant filled three cups. We raised them in mutual salute, then drank.

It was water.

In silence the leading Crarn turned and walked from the room.

### CHAPTER XII

### A LONG TREK

A LTHOUGH the great blaze died down within five days or so, a vast column of smoke continued to pour forth for nearly three months and up to the time of our departure the mass was still smouldering and unapproachable. In Plant's opinion it will be a matter of years before combustion finally ceases.

It was necessary for us to make arduous journeys, occupying several weeks in all, before the last of the

seventy three large refuges and over two hundred lesser ones was in flames for, although the Grak forces could be entrusted with the annihilation of the field armies, we did not think it wise as yet to allow the power of making fire to pass into their hands on account of the awful consequence that would result on its careless use near Grakok. These journeys were however useful, for we were able to increase our stock of raw materials for the manufacture of chemicals and to make many discoveries.

As our supply of matches would have been wholly inadequate for the prolonged work of destruction. Plant ingeniously devised a small thinwalled cement incendiary bomb, containing a small quantity of fulminate of mercury. These when hurled from a safe distance proved quite effective. Many hundreds of the smallest and most ancient cities were cleared piecemeal by detailing detachments of Grak labourers with a small bodyguard of soldiers to penetrate to the central chambers and sprinkle the food stores with a solution of corrosive sublimate. This was carried out successfully with a fair percentage of poisoning casualties. At a later date, smaller strongholds these were cleared up, repaired and regarrisoned by Grakan colonists.

This method of disposing of the young Krugs resulted in our being supplied with a very useful material. which, in the absence of all textile materials from Ganymede, we found indispensable for several purposes. We discovered that the skins of the nearly mature young, when carefully tanned\*, formed an excellent leather,

<sup>&</sup>quot;We learnt later that at this time Ganymede was under special observation through one of the great telescopes at Cambridge US.A. The giant burst of flame had been distinctly seen and the phenomenon noted in the records of the observatory. The date sorresponded exactly with that entered in my diary.

<sup>\*</sup>At first we used the contents of the large poison see at the base of the sting, which consisted largely of formalin. Afterwards we used chromium salts and chloride of lime.

from which we were able to make rough but serviceable underwear, ropes, bags and other valuable articles.

At last however the monotonous but necessary work of extermination was accomplished, and to the best of our knowledge no living Krug remained on the surface of Ganymede, unless indeed other and utterly unsuspected communities dwelt in the vast unknown regions on the surface farthest from Jupiter.

This possibility Plant was disposed to reject, pointing out that the enormous gravitational pull of the giant planet would have had the effect of drawing all the water and most of the atmosphere in his direction. Also he was of the opinion that on the opposite side of the satellite the effects of Jupiter's warmth would not be felt and, with the daylight periods warmed by but one twenty seventh of the sun's earthly power and interrupted by 86 hour nights of utter darkness, any life of such forms as we could comprehend would be out of the question.

Further he had little doubt that to the part of the satellite's surface on which The Comet had alighted this being the site of the last remaining surface water, all Ganymedian life had in bygone ages drifted. This conclusion was endorsed by the most eminent astronomers of Europe and America, after hearing our account of the conditions of Ganymede.

We did not stay at Grakok until all these minor cleaning-up operations were concluded, as they occupied many months. Instead, our essential part done, we commenced to prepare for the expedition that we had long planned, in which we proposed to follow the channel of the river which we were convinced had in olden days fed the central lake, the dried bed of which we had crossed on our way to attack Krugok.

Our preparations were made with great care. As a preliminary, detachments of Grak labourers were sent out, each with a bodyguard of soldiers, pushing before them carts of a lighter and improved type, laden with supplies of food and water. Large caches of these provisions, they were ordered to deposit at intervals of fifteen terrestrial miles, for as great an aggregate distance as their own rations allowed them. They were then to deposit all their remaining stores and return. By this means the first 300 miles of our projected journey was fully provisioned.

Although they can count, the Graks have no idea of measuring distances, but a simple scheme was devised to overcome this difficulty.

A bright vermilion streak was painted on one of the wheels of the leading vehicle. The diameter of these wheels being about four feet, every revolution accounted for four yards.

On the trolley were placed three receptacles, one of which contained exactly 2160 small stones. The Crarn who was placed in charge of the expedition travelled on this cart and, at every twelve revolutions of the wheel, transferred one stone to a second container. Whenever the receptacle was emptied, a cache was made, a single stone was placed in the third vessel and the transferring process reversed. A count of the number of stones in the third receptacle, multiplied by fifteen, gave us the total lengths of the journey in miles.

BY the time this expedition returned, all the preparations were completed for our own journey. We took with us four vehicles loaded with provisions. To each of these were attached ropes of plaited Krug skin on which eighteen labourers pulled, whilst six more pushed behind. We also had a bodyguard of forty-eight soldiers, whilst a Crarn rode on each cart.

Certain items for possible emergencies, in the form of a few fulminate bombs, some strong vessels containing corrosive sublimate and some filled with HCN, were packed in the first cart with the distance-measuring device which was to be used beyond the three hundred mile point.

Our glasses, headgear, matches, clubs, compass, corrected for Ganymedian conditions, and a small altimeter from The Comet completed our equipment. The altimeter we took so as to be able to ascertain the height of the mountains we hoped to discover. To save fatigue we dispensed with our armour.

During the first three hundred miles we drew on part of the ample caches for our rations, so as to keep our loads intact for the later stages of our long journey. After that, our plan was to use the stores on one of the carts only making also small caches every twenty miles until the cart was three parts emptied. We then made a cache of the remainder, except for sufficient . to supply those whom we sent back with half rations until they reached the three hundred mile point. The first cart returned with its team of twenty-four labourers and also twenty-four soldiers.

The same plan was followed with the second cart, the returning party of twenty-four haulers being accompanied by twelve soldiers. When the third cart had been similarly depleted, we sent it back with forty-five labourers and six soldiers, the last vehicle being thenceforward propelled by the remaining eighteen soldiers and three labourers. These latter we retained mainly for the purpose of feeding the warriors, who could not help themselves owing to the size of their jaws and the inscrutable Law of the race. One Crarn accompanied us, one having been sent back on each cart.

Our distance-register showed that we had travelled nine hundred and seventy-five miles from Grakok in a direction mainly north and now through our glasses we could see the dim outline of a range of mountains in a direction NNW. We decided however to keep to the stream bed, which after another twenty miles or so swung round as we had expected in the direction of the mountains.

As we approached them they revealed themselves as of vast extent and some six or seven thousand feet high and apparently flat-topped, reminding me of a large reproduction of Table Mountain as seen across Table Bay from Blaauwberg beach, except that they were of an extremely light tint.

"There is the 'ice-cap' of our astronomical friends," laughed Plant, "which shows the danger of guessing at such things. I expect the canals of Mars will prove similarly unsubstantiated."

Right into this mountain-mass led the stream-bed, now narrower and deeper and strewn with boulders. Soon the uphill climb became appreciable, then arduous, till finally at the foot of a slight cliff, that must once have been the site of a cascade, we were compelled to abandon the cart altogether. This was just 1178 miles from our start and had taken us forty-nine days to reach. This was quite good going even when our lessened weight was taken into consideration.

For the final stage of our journey we decided to take nine of the soldiers and one labourer. The twelve of us loaded ourselves with as much as we could carry of food and water. We also took the altimeter, the compass, our clubs and a selection of our various lethal stores. The rest we left with the cart under guard of the remaining nine soldiers. With them stayed the other two labourers and the Crarn.

Owing to our bodily lightness, we did not find the climb very arduous despite our heavy loads, which by the way were now contained in the bags which we had with some difficulty made out of the skins of immature Krugs, specially treated and sewn with strips of the same material.

For the most part the ascent presented no difficulties, though several more small cliffs had to be climbed or circumvented. In the rocky streambed and on the cliffs that gradually flanked us as we mounted higher, Plast recognized veins of several familiar mineral ores, as well as some that had no counterpart on our own planet.

Once he kicked against a knee-high boulder, then, calling me to his side, he took out his penknife and scratched the huge lump. A bright yellowish gleam caught the sunlight. It was a mass of pure gold. Later we came across several similar lumps and ence we walked for twenty yards or so across a bed of pure gold gravel, a small quantity of which we put in our pockets.\* At a height of four thousand feet as registered by our altimeter, we were confronted by a formidable cliff some six hundred feet in height and at first apparently unscalable.

However, after about an hour spent in exploration and in abortive attempts, we managed to reach a long slanting crack, which offered a narrow and precarious path of ascent. As we climbed higher, the crevice gradually afforded less and less foot-hold, until we were supported by our toes alone with such medgre hand-holds as the inequalities of the rock offered. It was here that our expedition suffered its first casualty.

Although they possessed six limbs to our four, the Graks were essentially creatures of the level plains and this kind of climbing was utterly novel to them; also the warrior caste are not accustomed to carrying burdens. It thus happened that the rearmost of the ascending file, passing round a shoulder of projecting rock, allowed insufficiently for the bulk and weight of his pack, overbalanced and with a despairing clutch at the bare stone, crashed down into the ravine two hundred feet below.

Whether his gravitational lightness and the strongly armoured nature of his body would have saved him from instant death I cannot say, for by an ill chance it must have happened that the small fulminate bomb, of which we all carried one, struck on a projecting rock, A roar, a sheet of

HERE was enough of the yellow mretal to set the stock markets of the world in a state of utter chaos could one tithe of it be transported across the void. To us on Ganymede it was useless except for the vessels and implements that could be made from such of it as we might be able to carry back to Grakok.

<sup>&</sup>quot;A sample of this has been carefully assayed and chemically examined by Sir Joshua Stikland who pronounces it to 98% pure gold with an atomic weight of 196.88 being what is known as an isotope of the metal with which we—or rather some of us—are familiar.

flame, a rushing wind that nearly swept us from our precarious hold and our number was reduced to eleven. It was a curious commentary on the manner in which our sense of proportion is distorted by personal contact, that we felt more shocked by this solitary death than we had been by the vast hecatombs of our war against the Krugs, in which also our allies' casualties must have mounted to millions.

This mental reaction is of course universal. We encounter a neighbour on our way to our suburban station.

"Did you hear about Brown?" he asks. "Oh, you never met him? Used to work in the Empire Insurance Company. Sometimes travelled on this train. Died suddenly last night. Most trayic. Wife and two children."

"Dear, dear," we reply, "how terrible. I am sorry to hear that." And for a few moments at least our feeling of well-being is quite damped.

Opening his paper in the train, another remarks.

"I see there has been a terrible earthquake in Japan. Casualties so far exceed two hundred thousand."

"Really." we rejoin politely. "Everton played a good game against Aston Villa on Saturday, didn't they?" Yet actually Brown means no more to us than any single one of those stricken thousands. Curious. isn't it?

Luckily this last stretch proved to be the worst, and another half hour found us at the summit of the clift and opposite a great gap in the rockwall, that in places still towered a thousand feet above us.

Into this huge cleft we penetrated, eager to see to what fresh scenes our long climb had brought us.

A further half-hour's scramble and we were through the great gate-way and looking out and down on a scene the stark, stupendous grandeur of which eclipsed anything even my extensive travels had brought me to.

Our height was 5984 feet. Behind us, we looked back upon nothing but an endless expanse of saffron-hued desert, across which the dry water-course could for some distance be discerned. In front of us yawned a vast chasm, well over a thousand feet deep, bounded for the most part by sheer cliffs above which a hundred sharp peaks formed a jagged skyline.

We were now facing almost due north. To the right the rock wall extended beyond our range of vision in seemingly endless curves and buttresses. A few miles to the left, it took a sharp bend towards the north-west in a vast parabola, that swept past us and to the northeast at a distance of at least a hundred miles, probably more.

No words of mine can describe the sheer breath-taking grandeur of the sight presented by this colossal chasm, flanked and floored by masses of multicoloured rocks that, stretched out under the mingled light of the three celestial globes—Europa was now near her full in the western sky—glowed and shimmered like the shattered fragments of some vast geological rainbow.

For nearly an hour we sat and gazed spellbound. That is to say Plant and I did, for the Graks gave no sign that the sight in any way impressed them. All the sentiments our head-gear recorded were of doubt as to our ability to proceed and indications of hunger.

Called thus to our own needs, we made a hearty meal, whilst the little worker fed our bodyguard. During this overdue lunch, we discussed the situation and the probable origin of the yawning gulf before us. "I think it is pretty obviously of volcanic origin in the first place," was Plant's opinion. "The amount and variety of the visible minerals point to that, but it must be enormously ancient.

"Unless I am greatly mistaken we have in front of us the original source of Ganymede's water supply. From the fact that the water obviously overflowed through this gap to form the river-bed we have come up, this great hollow must have been full of water kept at overflowing by the naturally heavy rainfall, for at the epoch before the planet became completely desiccated these mountains would be the chief condensing point of the clouds that would naturally gather here."

"Then what do you think happened to cause such a vast amount of water to disappear entirely?" I asked.

"One can only surmise. The most obvious conclusion would be that some huge cataclysm caused a breach somewhere in the wall away to the east there and allowed the water to escape down some other channe!"

"Well in that case there will be a great lake somewhere in that direction. If we can get down this cliff in front of us we may as well explore as far as our supplies permit. The presence of water may mean the existence of other types of life, maybe even of another civilization," and fired by the idea I rose to my feet with an alacrity that almost sent me over the edge of the gulf.

ON closer examination we found that the cliff on the side nearest to us was less steep than had at first appeared and after a few tests we found a practicable way of descent and an hour's scramble brought us to almost level ground. The term "[see"]

was only comparative, for the surface was very rough and broken up by large boulders, with here and there patches of smaller stuff. Plant examined many of these boulders and from time to time made entries in his note book.

"Here you are, Ronald," he called outstooping and picking up something, "Here is a stone to set in the ring that you make from that lump of gold back yonder." He held it out. It was as large as an ostrich-egg, water worn and fairly smooth, and cast back the mixed light from a score of points that gleamed like so many deep purple stars. "A diamond I should say, but of what an amazing colour. This should set Hatton Garden in a twitter of excitement."

He tossed it to me and for a while I stood toying with it, enthralled by the superb scintillations that burst from it. What was its value on earth, I wondered. Something represented by eight places of figures in the pounds column I should imagine. Were this an imaginative story I should write that I cast it away as valueless in our present situation and merely a useless burden. In point of fact, I must confess that I stowed it away in W Krug-skin bag.

After a time the going became easier as the patches of gravel became larger and more frequent, and we made good time. Many more gems we encountered of all sizes and of all colours of the spectrum. One great lump as big as a Cheshire cheese glowed as if a yellow-green fire burned within

"Have you room for that in your rucksack?" chaffed Plant, as I turned reluctantly away. "Wonderful how attractive crystallized carbon can appear, especially when permeated with a little metallic oxides, Isn't it?" "Just wait till I come back here with a six-ton lorry," I retorted, "and I'll show you what the world will say about crystallized carbon. 'A little metallic oxide' indeed. That is the worst of you scientists. I believe if you encountered Venus de Milo in the flesh, arms and all, you would just say, 'Wonderful how attractive a little vitalized protoplasm appears when covered with squamous epithelium.' Bah."

My companion laughed. "Our prospects of seeing any sort of woman in the flesh seem to be so remote that your accusation can hardly be put to the test, but I accept your rebuke. Yet after all what's in a name? A . . . ."

"For Heaven's sake don't start quoting Shakespeare unless you want to suffer some of the slings and arrows of outrageous..."

"Pax," cried Plant hastily, and we resumed our journey.

We halted for the night, true to our agreed division of time, on a level patch, had a meal and slept for about eight hours, whilst the Graks squatted near.

After breakfast we renewed our journey which was quite without incident, until we had again halted at the end of a twenty-five-mile tramp.

We had camped about four hundred yards from a mass of huge tumbled boulders that had been a conspicuous landmark for some miles. Our leather suits were ample covering in this dry air that, despite the altitude of now just over four thousand feet, remained at the fairly constant Ganymedian level of from 60 to 67 Fahrenheit.

We had been taking stock of our supplies of food and water, especially the latter and had decided that in the event of a view through the binoculars from the summit of the boulders showing no sign of water or other marked difference in the nature of the land we would start back the next day. With the idea of settling the matter at once, we were just settling out towards the point of vantage when suddenly there came a loud whistling creak of warning "Krug, Krug" "from one of our bodyguard and a weird looking object emerged into view from amongst the clump of rocks."

Jet black and every bit of thirty feet long, it covered the ground in vast loops of its serpentine body.

Extending to its full length, it would grip with the six legs that were set closely together on the first five feet of body. Then by a strong muscular effort it would bring up its rear end until this was approximated to the forepart, the intervening section being raised in a great loop about nine feet high. Then taking hold by means of the pair of large claws with which its hind quarters were furnished, it again extended the fore part. Its progress was amazingly rapid and it was making straight for us.

I had barely time to note the great saucer-shaped eyes two feet in diameter and the champing multi-jawed mouth, when there was a blinding flash, the black loop vanished in a cloud of dust and stones and we were hurled violently to the ground. Plant, less engrossed in the study of "natural history," as he called it, had thrown a bomb. Somewhat shaken but unhurt, we hobbled over towards the slowly settling dust-cloud. There was not enough of the monster for even the most enthusiastic nature stu-

<sup>&</sup>quot;The "creaks" or sounds forming the word I have spelt "Krug," from a natural association of ideas, form amongst the Grasks a warning of any kind of danger, their scarlet foes being practically the only one they had known for thousands of generations.

dent to become engrossed over. The interesting point was however the remains of the creature were pulpy and moist

"We can't be any great distance from water." I remarked. "Even with its rapid rate of progress, this beast would have to keep within reasonable reach of water or of moist animal or vegetable life to maintain such a condition."

"Well it came from the direction of that cluster of rocks." rejoined my comrade. "If you feel game to risk a return on half rations of water, I am game to explore a few miles further tomorrow."

All the stiffness had departed from our limbs after a night's rest and we set off towards the rocks. As a precaution in case another monster might be luxking there, Plant and I kept well to the front carrying a bomb each in addition to our clubs, the Graks following with our ruck-sacks. Luckily we had discarded these the previous evening before we were thrown down by the explosion of the bomb, or our fate might easily have been that of the fallen Grak. Our present manner of approach was to avoid any similar contingency.

CAUTIOUSLY we penetrated between the great boulders, but without meeting with a living creature. Suddenly, Plant, who was in advance of me, halted and gave an exclamation of surprise. A few steps and I was by his side and we both stood gazing into the mouth of a great opening, part cave, part pit that confronted us.

"That explains it," commented my friend.

"Explains what?" I asked. "That great black flexible sausage?"

"Well possibly it explains that

also," was his reply, "but I meant the

"Good Lord," I ejaculated. "Do you mean to say that all that huge lake emptied itself down this hole as it someone had pulled the plug out of a bath? Why it would take centuries."

"And why not?" was the retort.
"What do centuries or even hundreds
of centuries matter in such a case?
A crack through a rock-fault in the
floor of the lake and nothing else could
happen. Provided that is," he added,
"that there was somewhere for the
water to go."

"And where do you think it has gone?" I argued. "It can't just have gone down that hole unless it has an outlet somewhere"

"Well that is what we are here to find out," he retorted. "Are you game for a little underground exploration for a change?"

I was game, of course, though after having seen the black snake thing and considering that it had most likely emerged from this cavern, I could not pretend that I was eager, and said as much.

"Good, then if you will just scramble up that big rock and have a good look around, I will call up our attendants," he offered and started off at once.

I found however that there was nothing to see from the highest rock but what we had been seeing all the previous day. We had traversed about one-third of the distance towards the northerly cliffs and as far as I could say were now at the deepest part of the huge cup. Far to the east I could just make out what I took to be the far barrier-wall, every bit of three hundred miles distant.

When I had satisfied myself that there was nothing living in sight—I did not relish the idea of having another of the long black monsters coming down the hole in our rear—I rejoined the others, took up my own rucksack and in single file we started to clamber down the great gulf, Plant and I leading the way.

### CHAPTER XIII

#### THE GREAT CAVERN

HE declivity was less steep than we feared might be the case and it was not long before we found it necessary to adjust our visors.

"If we encounter any more livestock we had better use the HCN bombs," advised Plant. "I don't fancy fulminate of mercury down here."

"For anything of an aquatic type should we come to water, a little of the corrosive sublimate should be useful. As far as our earthly amphibia are concerned the skin is highly absorbent. I have killed a frog in two or three minutes by applying to it a little of the poisonous exudation of a toad's parotoid glands." I had made a point of bringing out these little natural history observations whenever a chance occurred, and often even when one did not, as a sort of defensive counterblast to Plant's almost encyclopaedic knowledge in most other branches of science. His most usual reaction was a marked display of silent introspection, or an unapologizing change of subject.

Down and yet down we went. For the most part our progress was of the nature of a scramble down a series of steep declivities, some of which needed to be negotiated with the utmost care, if a serious fall were to be avoided. At other times, we found ourselves walking with ease along a stretch of nassage in which the descent was little more than appreciable. In places the water-course, for such we were convinced it was, widened out into extensive chambers, at times it contracted to a diameter of barely six feet.

In various regions of our earth I had explored great subterranean caverns, but never one of the depth of this and of course never under the perfect visual conditions that were now given to us by our wonderful visors.

Soon our altimeter indicated that we had descended one thousand feet, then one thousand five hundred and we were still steadily going down and down into the heart of the great mountain-mass we had ascended two days before. When we reached the three thousand foot level, that is to say over two thousand feet below the dry bed of the great primeval lake we had left, we halted for an hour for lunch and a rest.

"Well, we don't seem to be getting much nearer to water," I said. "I hope we get some soon as I am.not looking forward to going all that way back on short allowance. Still we had better keep on a bit longer, don't you think?"

"Certainly," replied Plant. "We have to descend the mountain some time and if this channel has an outlet it should bring us out at no insuperable distance from our encampment as far as I have been able to follow our general direction with the compass. So now, 'Once more into the breach, dear friends,'" and hoisting his pack on his back, he again led the way.

IT so transpired that we were nearer to the far-sought water than we imagined, for after another fifteen minutes' scrambling descent, the passage suddenly widened out into a nearly level tunnel, a sudden turn in which brought us into a large cave. From the mouth of this we looked out on a pebbly beach bordering a wide open rocky roof at a distance that could only be approximately guessed.

"Well, here is our water at last," I exclaimed. "Though it is not of much use where it is except for our present needs, if it is fresh, that is. How do you think this great cavern came here?"

"As I understand it," replied my companion, "this whole mountain is of volcanic origin and the large cup above us is the old crater. Aeons back, as Ganymede cooled down; which being so much smaller than the earth, it would do much more rapidly; the volcano would cease to erupt and the passage, by which the molten rock had found outlet, would be filled and blocked by the cooling lava. As the ages passed, the great basin thus left would become filled with water from the rain-clouds that would gather above it.

"Meanwhile in the deeper part of the mountain a large mass of still molten material would still exist, until, in the course of many millions of vears, this in turn would chill and harden. The contraction naturally following on the cooling of such a great mass would cause the formation of a huge cavern such as this, which at that time would be filled with various mephitic gases. More ages would pass and then some slight tremor, or earthquake if I may use the word, would cause a fault in the floor of the great lake above and down would rush the water to displace the oas."

"And thereby indirectly lead to the extinction of all animal life on Ganv-

mede, except the Graks and the Krugs who lingered on over a thousand miles away." I said.

"Don't forget your great black 'sausage," laughed Plant. "His ancestors also must have escaped the universal cataclysm."

"And if they did so, why not others?" I queried, "Quite possibly we shall come across more descendants of Ganymede's ancient fauna. Well, what do we do next? Do we go back or do we explore further? If we carry on, do we go to the right or to the left?"

For a moment my friend consulted the compass. "I think that we had better go to the right. That will bring us more in the direction we want, in the possible event of there being another outlet."

Before we started off on our walk along the beach, we cautiously approached the edge of the water, scooped up a handful and tested it. It was quite fresh and had a more pleasant taste than that from the Grak reservoir, which had not been in any way improved by having been kept in sealed bottles for over a month.

Having had a good drink and, as far as Plant and I were concerned, a thorough wash, we set out at a good pace followed by our nine Graks.

Several miles were covered without incident, nor did we come across any sign of animal life. As we progressed, however, we saw several clusters of a peculiar, dark brown vegetation, pulpy to the touch, yet of a singularly tough texture. Also in places the rocks were covered with a deep-green spongy growth which might have belonged to either the animal or the vegetable kingdom. The water being quite smooth, was crystal clear to our

visored eyes and many more and larger deep-green patches could be discerned.

Then from a rock overlooking an expanse of deep water, we saw a sign of definite animal life, the first since we had left the light of day, over two thousand feet above us. At first I thought that it was a great pale green rock of a surprisingly spherical nature, until I saw that, not only was it thickly covered by a thick cheval-de-frise with sharply pointed spikes some two feet long, each of which appear to have the power of individual movement, but also the whole mound, nearly nine feet in diameter, was moving slowly along.

Its mode of progression is wellworth a few lines of description. From amidst the array of spikes, in the direction in which the animal was advancing, were protruded a score or more of long elastic tentacles or feelers each two inches in diameter and furnished at the tips with a suctiondisc about a foot across. Whenever a tentacle reached its point of full extension, the sucker took hold of the rocky bed of the lake. When a sufficient number of suckers had secured a grip, by a muscular contraction of the tentacles, the body of the creature was drawn in the required direction. other tentacles meanwhile taking a hold farther on and repeating, or rather continuing, the gradual progress.

As we watched almost fascinated, we noticed that swimming about near to this sliding lump were numbers of small creatures, part shrimp and part fish, about nine inches long, that were busily feeding amongst the material that was being stirred up from the lake bottom. Suddenly one of these shrimp-fish was unwary enough to approach within three feet of the spinose

sphere. Instantly from amongst the spikes there shot forth a snapping three-jawed head on a serpentine neck and the careless little creature was seized. A few moments was it held till its struggles had ceased and then it was skilfully passed on from one to another of the suctorial tentacles towards the under-surface where we presumed the mouth was situated.

But it appeared that even this great spiney animal had its enemies, for now approaching from the deeper water we caught sight of still another of these bizarre aquatic monsters. Of a bright orange colour, it was shaped like a vast seven-cornered plate except that each corner was prolonged into a point. Excluding these points its diameter was a full fifteen feet. With surprising rapidity it seemed to flow over the ground and the mechanism of its progress was not at first apparent. Taking out the binoculars, however, I managed to make out that its whole under-surface was furnished with a multitude of short suckered tentacles that functioned in precisely a similar manner to those longer ones of the spherical creature, but in far more rapid succession.

Quickly it approached the great spikey ball, which seemed to recognize it as an enemy, for on its approach, from all over the surface of the ball sprang forth some hundreds of the serpentine nicks with their snapping heads. Those within reach of the intruder attacked it by seizing the nearest tentacles with a bull-dog grip. This attack was countered by the orange attacker by a sudden retreat that tore the gripping heads clean from their necks. A fresh advance was then made and the defense similarly countered, until at length all the snake-heads of this Ganymedian horror had been rent away.

The orange-hued aggressor then climbed up and spread itself completely over the surface of its helpless victim, whose spines it ignored.

"But what can it do now?" asked Plant. "It can never get a thing like that into its stomach"

"Let us watch," I replied. "It seems quite sure of itself."

As we watched, slowly we saw extending over such of the lower animal as was visible, a wave of pinkish membrane that gradually completely enveloped it. I gave a laugh. "Our orange friend has answered your question, Plant," I said, "by wrapping its stomach around its prev."

We did not wait to see the termination of this ambitious meal, which was probably long deferred, but re-

sumed our journey.

These things seemed to be entirely aquatic and conveyed no threat of danger to us, but shortly after traversing a broad stretch of beach and suddenly rounding a rocky buttress, we entered upon an adventure of an infinitely more exciting nature.

END OF PART II





# The Chemical Murder

### By EANDO BINDER

Emotions may lead to strange results. In playing with chemicals, unexpected results may follow your intentions and actions, so you should always be sure that you get the right reagent bottle. And there really is such a thing as being frightened to death. We are glad to present a story based on correct chemistry by an author who knows his science.

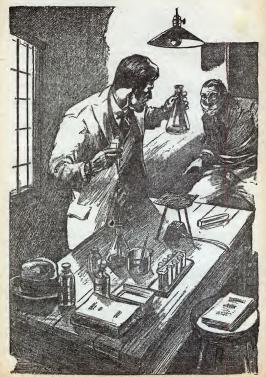
### CHAPTER I

### DISCOVERY

TARY FLETCHER was cleaning up in Master George's laboratory. Busily dusting with the feather duster, she took extreme care not to knock over any of the set-ups of glassware on the bench: Master George, kind and gentle though he was almost always, had a bit of a temper when something was disturbed or broken. But Mary didn't hold that against Master George; Lord no. He was really a very likeable man, naid his rent regular, kept his nose to his work, and treated her like a civilized being. Not like that other place she had had, where two of the boarders were habitual drunkards. and the other one a sneering boor. Master George never spoke crossly to her, never looked angrily at her, never chided her with the arrogance of a boarder. And in return, Mary did far more for him than she would have done for any other man who happened to rent rooms in her place. Somehow-Mary felt a little sinful each time the thought came to herthis kind, slightly grey-haired chemist called Master George reminded her of her dead husband, dead, poor soul, for these twenty years.

As she dusted off the long, black

composition table top, her eyes encountered the black leather-covered loose leaf notebook, in which Master George was forever writing, it seemed to her, Five years ago, when he had first come to live in this house, he had brought that notebook, and from then on she saw it every day, lying in various places. Mary didn't understand much about those things which Master George did, chemistry and experimenting, but it seemed everything he did went down in that notebook. Mary didn't know either what Master George was aiming for in his ceaseless boiling, pouring, melting, and stirring, but it must be something important. Oh. ves! Master George was no play-boy, she could tell that by looking into his soft brown eyes, and must be trying to do something of great consequence. Sometimes, with a little excusable curiosity, she would stay a bit and watch him in his work, but never could she fathom what it was all about. Master George himselfwell, she wouldn't call it exactly a failing-but he was just a mite closelipped about his work. But then, that was none of Mary's business, nor anybody else's, just so long as he paid his high rent (even Mary admitted it was high) and raised no undue rumpus. As long as he did his part, Mary would do hers: dust his labo-



"George Lockhart, these have been the preparations for what will be a PERFECT CRIME!"

ratory every day, give it a general clean-up on Mondays, send out his mail, receive his packages, prepare his meals, and keep his little bedroom in the back clean and tidy.

Although Mary would never admit it openly, hardly to herself. Master George was a mystery to her. When her neighbors happened to ask her in backyard conversation what "that there chemist man was a-trying to do with his smells and lights and chemicals," she would assume an important look and say that "it wasn't for the likes of her to be a-giving away the secrets of her boarder, more especially as he said himself never to gossip about him and his doin's." But for all the prestige she had amongst her kind in the neighborhood for having such a strange boarder, she sometimes felt piqued that she really knew as little as they.

Master George led a very regular life. He got up every day at 7:30 at Mary's knock on the door, ate breakfast in the kitchen at 8:00, and then went straight to his laboratory and worked there from 8:15 to generally about 10:00 at night, sometimes later. sometimes not so late, and sometimes all night. His dinner and supper he generally took a half-hour off for at noon and 7:00 and ate in the dining room, but sometimes he would not show up at those hours. At such times Mary would quietly peer into the laboratory, see him bent over some apparatus or dish or flask, and as quietly disappear again to bring back a little later a cold lunch on a tray. She would deposit this at one corner of the table and glance over to him just before she left. It always warmed her heart at such times when he happened to look up and say "Thank you, Mary," in his soft voice, or just smiled his thanks. She didn't mind at all the extra trouble when a man appreciated it like Master George. That was his daily routine. On rare occasions, about twice a month, Mary should judge, he left the house after eating breakfast, and stayed away all day. Where he went, Mary had no idea.

As for the man himself, Mary would say he was kind and gentle, civil and courteous, good-looking, with large, brown eyes, and very quiet, Not very big in size, but very tireless as a worker, at least in his laboratory, He seemed to have an unlimited source of money, and that was something Mary could never quite understand. Nobody ever called on him and he never sent out anything, so Mary couldn't see where he got his money. unless he got it those days he was away. Or else-Mary favored the idea -he had lots of money at least enough to be independent, and needed no more. Nevertheless, he paid his rent and board and room in three-month periods promptly in advance in good money, and as long as he did that, and got it honestly-Mary was certain he did-she would never say "boo,"

Of his work, Mary could tell you many things, none of which would be "Liquids a-boiling, correct. a-steaming, burners a-hissing, lights a-flashing, sparks a-flying," was the general description that to Mary pictured his laboratory. At times things much more vivid had been witnessed by her. Once there had been a bad fire: Master George called it ether. In a big pool on the non-burnable table-top and dripping to the wooden floor, the viciously-flaming ether seemed about to consume the entire room, and Mary screamed for Master George to come out and save himself, more anxious for him than for the furniture, But Master George, cool and quick, let the

ether burn itself out, while he played a stream of cold water from a running condenser all around the floor outside the ring of flame, not into the flames of burning ether. With characteristic suddenness, the ether burned itself out and Master George calmly threw away the cracked flask that had let the dangerous ether out on the table ton. Mary calmed her beating heart and looked in surprise at the small amount of damage to the floor done by the seemingly-hot flames At another time Master George came staggering out of the laboratory, coughing as if he had consumption, and pushed her to the windows. Between coughs he told her to open them all quickly, zero cold or no zero cold, while he, after dampening a rag and holding it to his nose, ran again into the fuming laboratory and dumped something down the drain. At another time Mary had heard a loud bang while she sat knitting, with an echo of tinkling glassware. In palpitating fear, she ran as fast as her years would let her to the back of the house where the laboratory was, and looked in Master George was just taking off a pair of goggles and looking with something like pain in his face at the mess of broken glass and colored liquids spread on the table top. He shut off the vacuum pump with an angry jerk. and stood for a moment in silent contemplation. As Mary started to clean up the mess, Master George gently pushed her away, and told her he'd do it himself, as long as he was the cause of it, and besides she might cut herself.

THE coming of Master George as her one and only boarder in her new house—that is, new in point of acquisition, not in age—had introduced into Mary's life a something else that was new. It wasn't any silly thing like love; she was past such thought, but it was a contact, however slight, with things in life that she had never known of or heard about. She realized it this warm spring day, as she dusted around busily, while Master George was eating his breakfast. Mary had led a very mediocre, drudgelike existence, and this interest in Master George and his work had put a new indefinable zest into her later life. She fervently hoped he would remain there for a long time, as long as she would be able to care for the house and care for him He had been sick at times, and that was when Mary could repay him in warm-hearted services for the kindness and comfort he had brought her.

Filled with the happiness of contented living. Mary began to dust off the rows of bottles of all shapes and sizes which reposed in a five-shelved cupboard against the back wall. Mary hadn't the least idea what all the things were in those bottles, but she had had strict warnings never to tamper with them, nor to let anyone else ever touch them. Most of them had strange names blown in the glass, some had paper labels stuck on them. As the duster flicked over the last two bottles on the lower shelf, their paper labels, which had been hanging loosely, dislodged and fluttered to the floor. Mary kept her eye on them and picked up the one-there was still enough glue to make it stick she could seeand pasted it back on the bottle it had fallen from. She did this in the way she had seen Master George do it, by wetting the tip of a finger, and rubbing it over the glue till it was sticky. Then she stooped carefully, for Mary was rheumatic these last few years, picked up the second errant label, and pasted it back on its bottle. Then the duster swept over the rest of the bottles merrily while Mary hummed a little tune to herself.

As the footsteps of Master George came to her through the open door from down the hallway, Mary unconsciously inveigled a smile into her lined face so that she could greet him in the way she felt was fit.

"A fine mornin', Master George," she said as he came in.

"Yes, indeed, Mary."

George Lockhart, the "Master George" of Mary's simplicity, was a man well up in the forties, with a touch of grey already in his black locks. Good-looking in a sombre way. he was possessed of large, soft, brown eyes, full lips, and a finely-chiseled nose. Of medium height, his roundshouldered figure betraved the sedentary life of a student of natural arts. His movements were deliberate and easy, and his voice, soft and unhurried. He walked with an unconscious grace to his desk, beside the window through which flooded the morning sun, and pulled out the drawer. His long nervous fingers held up a sheet of paper with a series of chemical names on it. After a momentary survey, he handed it to Mary,

"TII be needing these things, Mary."
"Yes, Master George," said Mary.
Mary knew just what to do with it:
put it in an envelope, address it to
the firm he bought all his materials
from, and mail it. Mastèr George had
an account with them. After a few
flicks at the bottles at suspected areas
of invisible dust, she tucked the duster
under her arm and walked to the
door.

"Oh, Mary," called Master George, halting her as she was about to leave, "my notebook; how is it that it's here on the table? I remember leaving it on the desk. Now, that's the second time something like that has happened. Mary, I've warned you, haven't I, never to touch . . . ."

"Why, Master George," broke in Mary aggrieved, "by all the saints above—beggin' your pardon for the oath—I've never touched it!"

Master George looked at her for a moment in silence and then said, "All right, Mary. Beg your pardon for being hasty, must be my imagination."

Mary left the room without a word, somewhat hurt that Master George should have so little faith in her. Ever since he had caught her looking through the notebook three years before, and severely chided her in one of his rare moments of anger, she had shunned the black book like poison. The only explanation Mary had in her mind—she could never say it to his face—was that the intense work was affecting Master George a wee bit and making him suffer from memory relarge or distortion.

Meanwhile George Lockhart picked up the notebook, toyed with it a moment, trying to remember definitely whether he had left it on the desk or the table, and finally gave it up as he numbled: "Don't know. Thought I left it on the desk. Must be wrong. Nobody ever in here, except Mary, and I'm sure she wouldn't..."

He broke off as the problems of the day flooded into his mind. With the vigor of absorbing fascination in his work to inspire him, Lockhart began the day's tasks. George Lockhart and his work were one, inseparable and indivisible. A bachelor all his life, he was married to his experimenting. He paused now and then to stand by the open window and breath in large lungfulls of the fresh, spring air. These refreshed him greatly for the laboratory was generally filled with a

variety of fumes, despite the steady activity of the swirling fan outlet above the window. In a short time he had the various units going, distilling here, crystallizing there, heating there, and boiling here. The big electric oven came in for its share of use. The vacuum pump was called to duty at times. The distillery usually delivered its stream of pure water all day long. He sat at the costly analytical balance at times, handling its delicate controls with practiced familiarity. And so the day went, The black notebook was periodically referred to and sometimes written in.

FORGE LOCKHART was on the eve of a great discovery. Five years of painstaking work had finally brought him within sight of the longawaited goal. This very day he expected results. Of course, several times before he had expected results. only to be bitterly disappointed; but today he felt closer than ever to the haven of success. Lockhart was one of those rare, very rare, human beings who experiment in virgin fields of research, with not a thought of gain, but only with the yearning for that which is new, unthought of, In other words, he was a true scientist. His special field was chemistry.

He had eaten his dinner with Mary, abstracted and half-heartedly. Mary, familiar with Master George and his habits, knew the value of silence at times like this, and withheld her usual small-talk with which she entertained him at mealtimes. But when suppertime came around, Master George was in a seventh heaven of discovery, and Mary placed the cold sandwiches on his bench and left, wondering what had gotten him so unusually excited. About 8:00 Lockhart stopped all operations except the big, quiet fan, and

concentrated his faculties on the distilling apparatus on the table.

In a small distilling flask, clamped on a ringstand, and fitted with an all-glass condenser, reposed a colorless liquid. With a small micro-burner Lockhart heated the material with infinite caution. Any accident would mean days of concentrated labor lost. The whole set-up was connected with a vacuum pump and manometer for distillation under reduced pressure. With his eyes constantly shifting from the thermomenter to the manometer, to the burner, he stood for an hour till the readings were correct.

Then the liquid began to distill. Periodically it would "bump" in the provoking way that liquids under reduced pressure do at times, and he would snap away the burner. But the Claissen neck of the flask trapped the splashing liquid so that it could not contaminate the distillate. In another hour he had distilled all of the liquid he could use, and carefully opened the air valve. Lockhart had become the acme of caution. It took several minutes to let in the air; he had been distilling at extremely low pressures. Finally he nervously twisted the flask holding the precious distillate off from its shellacked connection and held it up to the light. It was a clear, colorless fluid.

Lockhart stood there a moment in an attitude of prayer. He fervently prayed to a kind fate to grant that this liquid held the possibilities of the substance he was striving to produce. With a small pipette he measured off a small portion, added to it a standard amount of water and potassium permanganate as an oxidizing agent, and titrated the whole for an acid value.

"Still too dilute," he spoke aloud. Transferring the original distillate to a crystallizing dish, he placed it in the oven, set the temperature at 102 degrees centrigrade and closed the door.

Breathing a sigh of relief that, so far, all had gone without a hitch, he sat at his desk and opened the black book. Rapidly he turned the pages toward the middle. Then he read over again the note entered five years before when he had first conceived the idea of his present research. In his careful, small script was recorded the following:

"I commit myself, being independent and having the means, to the project of research into that field of organic chemistry which has to do with light-sensitive bodies, with the possibility in mind of actually synthesizing and isolating them. These light-sensitive bodies, which exist in the eyes of all seeing creatures, must be very complicated in structure and unstable in character, because of the extreme range of the eve and its remarkable adaptability. For instance, although sunlight is one half million times stronger than moonlight, one can see nearly as well in either light. When a person enters a dark room from bright sunlight, at first he sees nothing. Then gradually his sight clears and soon the formerly pitchblack reom seems to him much more brightly lighted. This can be explained only by the supposition of a series of closely related compounds existing in the retina of the eveball, which are manufactured almost instantaneously from a parent compound by the eves. depending on the conditions. Each of these related compounds must be very easily derivable from the parent substance, for the eve recovers very quickly from extreme conditions, and all of them must be easily disruptible. so that the retina can clear away the

bodies instantly and replace them with the others necessary under the new conditions.

"There is some reason to believe that these bodies are related to the cyanines, coloring matter of the flowers. I hereby devote my time and effort to attempt the isolation of the light-sensitive bodies, which, without a doubt, will be possessed of remarkable and valuable properties."

After reading this introduction to his work. Lockhart slowly turned the pages of the notebook. Leaf after leaf was covered with the formulae and data of the attempt to get at these elusive, almost mythical, light-sensitive compouds of the eve. Whole sections were sometimes marked "blind alley" indicating a particular tine of research that had led him nowhere. But gradually he had come upon small successes. He struck a series of compounds which were affected by light, but so slowly that he realized they were not what he wanted. The lightsensitive bodies of the eye would have to react instantaneously to light, as the eye does. Working with these slowacting compounds he built them up in hundreds of different ways, confident that some one of them would be "trigger-touch" to light. Once he got a solution that almost instantly turned different colors in streaks and hands when he let direct sunlight fall on it. but this also became only a stepping stone as he searched for the comnounds affected by ALL light, no matter how faint.

And now Lockhart was full of hope. Just a few days before he had hydrolyzed a white crystalline substance, one of his complicated triplecyanines, and saw it flash into all the colors of the rainbow in the ordinary light of his laboratory. He had danced around in joy that day, and surprised Mary by his exuberance. But he realized there was the task of isolating the end-product from impurities.

TO-NIGHT, as he arose from the desk and stepped to the oven which held such golden hope, he expected to culminate his five years of ceaseless labor with victory. There was just one more step in the process.

He opened the oven after shutting off the current, took out the hot beaker with a clamp, and again titrated a small portion to see how dilute it was. Satisfied with the result, he placed the still-hot beaker on an asbestos pad. His eyes glistened as he stood for a moment rubbing his hands and envisioning the stir his announcement of the discovery would make among scientific circles; especially back in the government labs, where his old fellow-chemists still worked in the old routine he hated so much. Coming back to earth again, he went into the small stock room for a moment and returned with a lightprojector.

He set it up pointing at a cleared space on the bench and switched it on. A faint violet beam bathed the beaker. With buoyant spirits he pulled down the shades and closed the shutters of the two windows. Beside the beaker he placed a flask half filled with a yellowish solution, a small pipette, a small graduate, and a rack of clean test tubes. Then he switched out the lights.

At first he could make out nothing except a faint violet glow. Then, as his eyes recovered, the area lighted by the violet lamp became fairly-well defined. Lockhart used the violet light for the final stages of the experiments, because it is the light to which the human eye is least sensitive. He reasoned that if he got the compound,

the violet light in which he worked would act so slowly on it that he would have a chance to store it away in the dark before it was totally affected, whereas any other light would have affected his compounds as fast as they were formed.

In the eerie, wavering violet light, in which the eye played such fantastic tricks as making the beakers dance and the pigette ripple like an eel, he carefully measured out a portion of the distilled solution into a test tube, added a pipette-full of the yellow solution, and put the tube in another rack behind the lamp in total darkness. In the second test tube he put a greater proportion of the yellow solution than in the first. In the third went a still greater proportion of the yellow solution, etc., till six tubes were filled.

Lockhart was breathing hard now, his heart beat like a trip-hammer. With six tubes filled and placed in the dark, he swung the beam of the lamp around in a quarter circle till it rested on the form of a lantern-slide projector. He fitted a slide into the slot on which was a series of seven bands of seven colors, which looked black in the violet light. Then in the dark behind the lamp he dipped into each test tube a strip of filter paper and pinned each to the side of a cardboard box so that they hung free.

Now he had to wait till they dried before the final test which would tell him whether success was his or whether he would again mark in the notebook—"blind alley." As he nervously drummed his fingers on the wall against which he leaned, his eyes encountered the door which was lighted by a few faint beams of violet. Startled, he saw it was open just a little way. There was no light coming from the hallway, because that was always dark at this time of night. With a dark at this time of night. With a pezzled frown he closed it. On a sudden impulse he swung it open and peered down the dark hallway. His eyes, used to the darkness for so long, outlined clearly the other end where stairs led upstairs to his room, to Mary's room, and to the new boarder's room.

Suddenly Lockhart caught his breath . . . . the new boarder! He had forgotten all about him, when he chided Mary in the morning about the notebook being out of place. It could just as well have been the new boarder rather than honest, good-hearted Mary! Either some sneaky urge of curiosity or of evil intent might conceivably prompt a man to steal into the laboratory in the dead of the night and look through the notebook: and maybe, Lockhart thought, the opened door could be attributed to him also. He could easily escape observation in the dark hallway.

The chemist went back to his work strangely troubled. The strips of paper weren't quite dry and he leaned against the wall, filled with conflicting thoughts. He hadn't seen the new boarder vet. Mary had explained that she had taken him, not because she needed the money or wanted the extra work, but because he was so courteous and said her reputation as a good cook had drawn him to her place. New was that just a blind for some scheme. some plot? . . . if the man were anything of a chemist, a thorough reading of the latter half of the black book would reveal the vast importance of the formulae in there. And he, Lockhart, like a fool had left his laboratory unlocked, had left his notebook with priceless data on the bench without a thought, so confident that he was safe from observation. As he again touched the papers and found them dry, he made the mental reservation

to lock the desk and the door from

He placed the first strip of paper from test tube number one in a wire holder afteen inches from the end of the projector and put over the whole thing the metal cover with felf flanges that completely trapped the light. Only the strip of paper would be lighted by the infinitesimal flash from the globe back of the seven-colored slide.

With his hand on the mercury switch, he paused a moment to draw a deep breath. This was the crucial test, the possibility of a discovery of vast importance, or another disappointment. He twisted the tube; the mercury, sliding from one end to the other, connected the circuit for a flecting instant while it ran past the bare ends of two wires, and reposed at the other end of the tube.

With trembling hands Lockhart lifted away the cover, snatched the piece of paper from the holder and held it in the full glow of the violet lamp.

"It works! Good Lord . . . . it works!" he cried in uncontrollable ecstasy.

A strip of black crossed the paper showing the presence of one of the colors from the projector, which one Lockhart didn't know.

Rapidly he subjected the other five strips to the same process. Each came out with a strip of black in a different position. He placed all the six strips in a tray of dilute acid to remove the remaining compound, like using the "fixing" bath in photography. No developer would be necessary for these remarkable compounds; they were sufficiently sensitive to go to the end of the process at once without stimulation, After carefully putting the remaining part of the unhydrolyzed solution in the oven to keep it away from light, he switched on the electric lights.

Partially blinded, he waited for his eyes to adjust themselves, wondering how long it would take to explain all the mysteries of evesight with his discovery, and then looked at the strips of paper. Each in turn had a band of red, orange, vellow, green, blue, and faint purple, the latter hardly distinguishable. Feverishly he fingered them again and again, mumbling to himself in joy and satisfaction. It was the greatest moment in George Lockhart's life, a life devoted to the search for truth. Perhaps nothing else in the world can be sweeter or bring more true happiness than the accomplishment of something no one else has done before, And George Lockhart walked on clouds, up and down the room, for an hour, his mind a mirror of sublime happiness.

With a mighty, unshakable calm, such as comes at moments like this, he seated himself at the desk and entered in the black book the final results of his research of five years' duration. Naturally there was much yet to be done, formulae to check, refinement of processes, tabulation of results, recording of variations, etc., but that would all be just an enlargement of this night's paramount results.

Finished with the notebook, he looked at the time. It was 4:00 in the morning. He must get to bed and awaken refreshed for the important work of classifying the many different variations of the parent substance to find out how each reacted to white light. He placed the notebook in the drawer and left the laboratory, forgetting both to lock the desk and lock the door, as he had resolved to do. The reaction to the excitement of the night came as he was undressing. His trem-

bling hands could hardly pull his shoes off. When he crawled into bed, he shook as if with the ague. But . . . . he was the happiest man on earth!

### CHAPTER II DISASTER

M ARY FLETCHER read the note that had been pushed between the sill and the bottom of the door.

"Stayed up till 4:30 and wants to sleep till noon ... poor dear ... he'll be a-killin' himself with his work, whatever he be a-tryin' to do," commented Mary to herself. This was nothing new to her; he had done that before, and she always made a tastier lunch for him at such times. Why he did such unreasonable things Mary could never understand. He had all the time in the world to do that messing around in the daytime; why he should stay up nights ... Mary shook her head, It was something she could never fathour.

And then the new boarder, he was another queer man. He insisted on having breakfast at 9:00, dinner at 2:00, and supper at 8:00, although she would much rather have had the two men eating together and save her some extra work. The new man was just as close-lipped, in fact more so. than Master George. She couldn't find out, contrive as she might, where he came from or how he earned a living. Really, Mary felt she had had enough of mysterious men, and would refuse taking another unless he came right out and told her those things she felt she ought to know . . . . yes, sir . . . they would have to tell how they earned their money and what relatives they had and so on. When she had mentioned the subject of Master George and his laboratory, the

new man had seemed to cough and then changed the subject abruptly. He evaded her attempt to suggest a formal introduction between them, and mumbled something about not intending to stay long, so it wouldn't be necessary.

Master Čeorge ate his dinner in abstract silence, with the far-away look that Mary had come to know meant he should not be talked to unless the subject was urgent. She had looked with mild interest at the six test tubes filled with gorgeously-colored liquids, and opened the shutters and raised the blinds in the laboratory in the early morning.

George Lockhart started the day's work with a song in his heart. He decided to run through a complete synthesis of more of the parent body of the light-sensitive compounds, to see if he could get a better yield. The production of that small beakerful of yesterday had cost him something like five hundred dollars, not to mention the time consumed. But when evening came around, he shut off the various units, closed the windows again, and began working with the violet lamp and light-projector. He wanted to flash upon the impregnated paper a picture in natural colors embossed on a slide, to see how faithfully it would be reproduced.

Lockhart was waiting for the paper to dry, after he had dipped it into a bath containing all the six solutions that had each produced a color the night before, when he suddenly whirled to face the figure that had caught the corner of his eye. He couldn't distinguish his features in the violet light clearly, but he saw the half-smile on the lips.

"What do you want?" said Lockhart coldly. "I suppose you're the new boarder?" He felt a small rage at the insolence of the man, coming in without a knock or a word,

"Yes, I'm the new boarder, George Lockhart."

"Well . . . ?" Lockhart choked a little in anger. "Out with it, man, what do you want here? I'm in the middle of an experiment and . . . ."

"And my presence is obnoxious, you wish to say?" finished the stranger.

"Well, I don't want to be rude, but... I would rather have you go." Lockhart was of a quiet nature and didn't have the gruffness to demand the trespasser to get out in plain words.

The newcomer suddenly straightened up. "George Lockhart, I'm not a total stranger to you. We have met before . . . ."

There WAS something familiar about the figure after all, thought Lockhart. Then, as the light snapped on, he recognized him.

With wide eyes Lockhart looked at the tall, dark-skinned man. "Raymond Wickersham!" he stammered. The other nodded sardonically.

Suddenly Lockhart's anger burst its bonds. He looked at the paper streaked with colors, the beaker with colored liquid, the ruination of his to-night's project, and shouted at the figure by the door, "Damn you, Wickersham, you've ruined all this! Get out of here! I'm going to set the police on you; you're an escaped convict..." In his towering rage, Lockhart ordinarily a peaceful man, advanced on the trespasser with clerched fists.

He stopped and turned pale. Wickersham had whipped out an automatic and pointed it at him.

"You'll do nothing of the sort, Lockhart, nothing of the sort . . . ."
"Listen, Wickersham," cried Lockhart, in sudden fear of this man with the gun "if it's money you want, I'll give you anything you want . . . . anything . . . . I've got plenty . . . . if you'll just go and leave me alone!"

"No, Lockhart, it's not money I want!"

The chemist turned whiter. He looked around desperately. He was trapped! He could guess what it was the man hinted at, but it was too horrible a thought for him to dwell on it!

"No. don't shout, Lockhart, It won't do any good. You might wake up Mary, but you'll have a bullet in your brain and I'll kill her, too, and make a clean getaway." His voice was cold and deadly. There could be no doubt about his threat. He would kill.

"Turn around, Lockhart," he com-

manded.

When Lockhart had his back to him, almost too weak to stand. Wickersham hastily drew a damp handkerchief from his pocket, laid his gun quietly on the table, and suddenly grasped Lockhart around the middle, holding one hand with the damp cloth to his nose.

Lockhart struggled with the strength of desperation, but was no match for the powerful Wickersham. As his gasping lungs drew in the chloroform, he became weaker and weaker and finally collapsed in his captor's arms.

Wickersham carried the limp form to the other side of the table, where there was a space between the table and the other wall, and laid it on the floor. With planned quickness, he picked up the arm-chair beside the desk and carried it around the laboratory bench away from the window. The table on which Lockhart set up all his apparatus, and which extended the width of the room, was on a sort of platform, thus standing on a higher level than the rest of the floor, Hastily Wickersham procured from the supply room a length of strong rope, and securely trussed up his victim in the chair, placing it up against the ledge. Then he busied himself with collecting certain pieces of apparatus and placing them in one place on the table,

THE breath of chloroform had been slight and in a half hour Lockhart came to, looking up with dazed interest. Wickersham was standing there looking at him, waiting for him to clear his head, an evil grin on his long, saturnine face,

"Wickersham, for God's sake! What are you going to do?" Lockhart cried tragically.

"I'm going to kill you!"

"Kill me . . . ? No . . . . no . . . . Wickersham . . . . have pity! My work . . . . what have I ever done to you?" Lockhart moaned in the anguish that tormented his quiet soul.

"What have you ever done to me? Lockhart, I'll tell you. Fourteen years ago I was a promising young chemist, working in the same division as you in the government laboratories. Today I'm a man with a prison record. I'm not an escaped convict; I was released a month ago on good behaviour. Do you know what I thought about for those fourteen long, bitter years, years when you prospered and inherited a small fortune? . . . I thought of REVENGE! Revenge on the one man who had ruined my life! YOU are that man, George Lockhart! I vowed to get out as soon as possible and then get you!" Wickersham glared at his victim with fierce hate.

"As there's a God above us Wickersham, I did only my duty . . . . you tried to poison the chief and by accident I was the only one who saw you steal into the locker room . . . . I had to testify . . . . I couldn't help myself!" Even in his agony, Lockhart wondered if anything he could say would seem reason to a man who had been in prison for fourteen years.

"Couldn't help yourself . . . . bah! ... when I came to you secretly and told you to keep your mouth shut. that I'd give you a better job after the chief was out of the way . . . . you could have saved me by denying it was I you saw . . . . but, no, like a fool, you told me your duty was plain, that I would have to suffer the consequences of my misdeed. Now . . . . NOW . . . . vou see how fate reverses things. You didn't think fourteen years ago as you bid me good-bye . . . a stony, hard-hearted goodbye . . . as they took me out in handcuffs, that I'd one day be free to come back . . . did vou? Ha! ha! ha!" Wickersham laughed a mad laugh of triumph.

Lockhart lost his head then and began to scream in mad, unreasoning fear of this avenger from the past. Wickersham leaped to him and rapidly gagged him with his handkerchief.

"You'll have to listen to the rest in silence, Lockhart. Listen to my story." Wickersham spoke softly. He knew Mary was a sound sleeper and there had hardly been enough prolonged noise to awaken her, the only other occupant of the house.

"As I said before, for fourteen long years I dreamed of revenge while I was imprisoned for that little sin. You were the main and condemning witness. A month ago they let me free. I have a brother out west. I got in touch with him and got back from him the money I had entrusted to his care when I began my sentence. I easily traced you after you left the government laboratories and found you here. I handed Mary a cock-and-bull story about her reputation as a cook and about her reputation as a cook and about her reputation as a cook and so we have the support of the suppo

she took me as a boarder. It didn't take me long to find out how things were run in this house. I arranged my meals at hours different from yours, so as not to meet you too soon.

"At first I was insane with the desire to kill and was going to shoot you some night when you worked late. But it's hard to get away with a murder like that, and I planned out something unique. Out of curiosity I looked through your notebook and saw your work. I decided to let things go on for a while till you finished your research... then I would kill you and take your secret with me. A sort of double revenge, eh, Lockhart?" Wickersham looked at his prisoner with mock humor.

Lockhart had become calmer. His large eyes stared hopelessly at his bitter enemy. Silently he cursed him up and down for every species of villain there was.

Wickersham continued. "Last night, in one of my regular nocturnal visits, I read of the culmination of your synthesis of the parent substance of the light-sensitive bodies of the eye. Very good work, Lockhart, I must say, but . . . . you shall never enjoy the honor and fame of having discovered them! That shall be MINE!"

Lockhart closed his eyes in misery and madly struggled in the chair, twisting and turning every which way, but to no avail. Wickersham looked on with undisguised joy, and chuckled at his discomfiture.

"Tm going to take your notebook to a small laboratory I purchased in Salem, Colorado, and run through your syntheses to become familiar with them. Then I shall arrange to demonstrate the possibilities of the discovery to certain wealthy captains of industry, and sell out at my own figure. I shall become wealthy, George Lockhart, and you . . . YOU will be dead!"

George Lockhart had gradually become resigned to his fate. He stared at his captor with dull eyes. Wickersham had the upper hand, now, and fourteen years of confinement had seared into his unscrupulous brain. There was no hope; Lockhart felt that deen down in his heart.

Wickersham had walked to the other end of the bench to get the trip scale and bring it to the table directly in front of the prisoner. Lockhart noticed he wore a pair of thin gloves.

"And now, George Lockhart," began the man from the past "let me recall to you some of your elementary chemistry. Perhaps your intense work in the field of advanced organic chemistry has temporarily clouded your mind to the simpler things of that science. Now, suppose we take oxalic acid and treat it with concentrated sulfuric acid, heating it, what do we get? Ah! . . . I see a flash of understanding in your eyes . . . we get CARBON MONOXIDE! One of the most deadly of poisonous gases, colorless and oddreless."

The tormentor grinned maliciously at the object of his venomous hatred. Lockhart shuddered violently and made little grunting sounds in his throat. The veins stood out on his forehead as he tried hopelessly to burst his bonds.

"Yes, Lockhart, carbon monoxide. I have carefully measured the dimensions of this room during one of my secret, nocturnal visits and find the total volume to be not over 150 cubic meters. Since a concentration of one volume in 800 of air is sufficient in a still atmosphere to kill in thirty minutes, it is simple to figure that about 400 grams of oxalic acid will produce

enough of the deadly gas to send you to death."

If there had been the least spark of humanity in Wickersham, he would have spared his victim this drawnout discussion of his methods, but in unholy give he watched the trapped man as a cat watches the mouse it has in its power, to enjoy to the full its terror of extinction.

IXTICKERSHAM then began the preparation for the production of the gas. As he worked, he spoke, knowing that every word he said tortured his victim that much more, "So, we take the oxalic acid bottle, measure out 450 grams . . . just to make sure there's enough . . . . long time since I've done this kind of work . . . . fourteen years! . . . and put it in this two-liter flask. We put the beaker on this asbestos wire gauze and under it the electric heater. Then the sulfuric acid . . . something over 500 grams . . . stir it with this glass rod. There . . . all ready!" Wickersham turned to face the doomed man.

"George Lockhart, these have been the preparations for what will be a PERFECT CRIME! When I was in prison and talked with some of the lifers. I heard stories of how they had attempted "perfect crimes," only to have some little mistake of theirs bring them to the law. But not me . . . . I've thought of everything, In the first place, Mary won't be here until morning, long after you are a lifeless corpse. This automatic timer and shutoff on the electric heater is set for three hours. By that time all the oxalic acid will be decomposed. When Mary comes in to-morrow morning, she will open the door. The fresh air will sweep in from the hall and clear the laboratory. She will see

you trussed up, call the police, and they won't know what killed you! They'll look for all sorts of poisoning in the stomach and throat, but not in a hundred years will they think of examining your lungs for carbon monoxide poisoning. They will find no weapons, no signs of death-dealing things. On the bench they will find your apparatus, among it a flask half filled with dilute sulfuric acid diluted by the water molecule of the oxalic acid. Mary, of course, will tell them that I must be the murderer because I will be gone, your notebook with me. But, Mary hasn't the least idea in the world who I am, where I came from, or where I'll go, I am wearing these gloves so that my fingerprints won't convict me. I have a railroad ticket in my pocket for Salem, Colorado, Isn't it great, Lockhart? The PERFECT CRIME! And I'll benefit by it in two ways, your death and your discovery. There won't be a single, solitary clue. It will baffle the police. They'll attribute your death to heart failure, apoplexy, a things, but they won't know that the red blood cells in your lungs have been rendered useless as oxygencarriers by the carbon monoxide so that you will starve for oxygen . . . ." Wickersham was in an ecstasy of

wickersnam was in an ecstasy or gratification. His fourteen year wait for vengeance was about to be fulfilled to his complete satisfaction . . . . and safety. Beneath his conscious reason for revenge against Lockhart, there was also the desire for repayment to the law for the fourteen years of insults and servitude. It would gratify his ego to read in the papers about the murder that couldn't be solved.

"You may wonder why I don't dispatch you in a simpler, quicker way,

shooting you, choking you; but there is something crude about those methods that goes against me. Much rather would I leave you alive, knowing that within an hour after I leave you will be as surely dead as if I had myself smashed your head. You. Lockhart. are a refined gentleman; it is fitting that you depart in a refined way. You won't suffer. You will gradually get sleepier and sleepier as the fumes fill the air, till you have finally breathed enough to destroy a good part of the hemoglobin in your blood. Then will come the last and final sleep. But I give you a word of cheer, Lockhart. your discovery will live after you. What will it matter to you that my name will go down in the ages as the discoverer of the light-sensitive bodies, rather than yours? You can console yourself with the thought that. after all, you made the discoverywhile you feel your lungs gasping for fresh air!"

Wickersham was a coward: George Lockhart knew that. That was why he chose this method of murder. It eliminated those grewsome details that the cowardly heart of the beast that stood over him could never face. And he was as cruel as he was cowardly. His hissing tongue was cutting Lockhart's nerves to shreds, Every word was a burning coal to the fire that was consuming the soul of the scientist. At times a vast rage shook him that fate could be so cruel as to loose this monster on him just when he was prepared to deliver to the world a great discovery.

Wickersham was speaking again; he had just turned on the electric heater under the beaker and checked the timer. "So, George Lockhart, I must say good bye. Good luck to you, wherever you are going after death. You made a mistake when you tried to ruin Raymond Wickersham fourteen years ago. Fourteen years is a long, long time, Lockhart; you can't realize how much mental suffering I went through in that time. I determined to make you pay, and pay you will. There is no hope for you, none whatever, I've figured the whole thing out too carefully. It's the perfect crime! Look . . . . the stuff is beginning to work already . . . ."

From the beaker came small streamers of vapor. Wickersham looked like some evil genii of ages gone by, conjuring forth evil forces by secret incantation as he pointed a dramatic finger at the pot of death. Then he walked to the door. He turned to the scientist, holding up the notebook.

"Here's to you, George Lockhart, discoverer of the parent substance of the light-sensitive bodies of the eye!"

FOR a long time Lockhart was quiet. There was a vast stillness in the room. As his eyes adjusted themselves to the darkness, the outline of the beaker and the rising curls of water vapor came to him, silhoueted dimly by the glowing coils of the electric heater. Fascinated, he watched the vapors arise and disappear into the darkness. In a short time, perhaps even now, the deadly odorless, invisible carbon monoxide would arise, and poison the atmosphere of the small room.

In a sudden mighty rage at his

impotence, the rat in this ingenious trap flung his body about in a mad attempt to get at the beaker, to free himself. He knew that if he could somehow knock over the ringstand, spilling the contents, he would be saved. He might get severely burned by the strong acid, but what was that compared to slow, certain death! But Wickersham had thought of everything. The ledge between the chair and the bench made it an impossibility to get within reach of the apparatus. His legs were tied securely to the chair away from the floor so that he couldn't use them as levers. Lockhart rocked the chair back and forth in the hope that the thumping noise would awaken Mary. But how futile a hope that was! Mary's room was away up in front, upstairs, and she was a sound sleeper, as she herself avowed. Nothing short of a cannon shot would get to her. And the neighbors, it was still more impossible that they should awaken.

Lockhart stopped the violent rocking. It was useless and besides he was constantly in danger of tipping over on his back or side, and that would make things still more horrible in either of those constrained positions. Better to sit and face his doom.

Now a sound arose in the room: it was the faint singing of the heated mixture in the beaker, heralding the approach of the boiling point of the liquid. From the bottom of the beaker, the little specks of oxalic acid shot upward to the surface, carried by the strong convection currents of the sulfuric acid. It didn't look white, it looked red in the glow of the coils! Red....red blood! It's blood! It was going to eat into his blood! The poisonous gas would arise and search him out! And he could do nothing!

George Lockhart moaned in mental

anguish at the blindness of a fate that had thus allowed him to be trapped in a vicious web of slow, soul-torturing death. Why did this have to be visited upon him? What great sin had he done to deserve tms? Surely it was no sin of his when he had testified against Raymond Wickersham fourteen years ago?

Wickersham had become overly ambitions. He was high in favor of the chief who hadn't vet seen his treacherous nature. Lockhart had hated Wickersham from the moment he had laid eyes on him. Then Wickersham had pulled his poison act, had doped a sandwich with mercury chloride. Clever, because Chief Seltzer had been working with mercury salts at that time. Lockhart had seen him furtively sneak out of the locker room. Undecided what to do, and suspicious of his actions, he delayed saying anything till after lunch, When the chief mentioned a funny taste in his lunch, it all flashed on Lockhart. Together he and the chief quickly analyzed a crust of the doped sandwich which the chief had thrown in the garbage pail, and finding mercuric chloride, used antidotes in time to save the latter's life Then Wickersham had been called in, accused and arrested after a confession which revealed his cowardly nature. But he had remained stubborn for three days. They told him Seltzer was dead, that he would be convicted of murder in the first degree that a confession would save his own life. Confronted with Lockhart's statement of detection, he broke down like a baby, Before he signed the confession, he managed to get a private interview with Lockhart, begged him to retract his statement, saving him; promised him a high position. But with loathing Lockhart had declined to enter into the nefarious scheme. Witkersham had been convicted on his evidence.

These events of the past flooded Lockhart's mind like ghosts from a grave. He must suffer for having done his duty; must suffer for the mad scheming of a conscienceless fanatic. The bitterness of an undeserved fate overwhelmed him to make still more maddening this, his last hour of life.

Then Lockhart went over Wickersham's plans, tried to see a possible loophole for himself. But there was none! He was as good as dead, and they would never find a clue to connect up this affair with the true murderer. It would be an unsolved mystery to the police. His death was inevitable; Lockhart could see that now. Oh! if only a kind fate would somehow punish the murderer, somehow point him out to the law, so that he, Lockhart, would not die in vain!

He had tried to avoid looking at the beaker, but with the fatal attraction of the mystery of death, his eyes fixed themselves on the bubbling fluid. He could see dimly the beginning of reaction between the oxalic acid and sulfuric acid. Bubbles arose which be knew were messengers of strangling death . . . . carbon monoxide . . . . the robber of hemoglobin! Lockhart staved off insane fits to yield to the pressing influence of hopeless madness. His strong mind bore up under the terrific strain of waiting for inevitable extinction. There was no hope, but the scientist, so used to submerging the personal element in the interests of science, was able to look almost calmly at the last chemical reaction it would be his privilege to witness. He began to review his life with a feeling of satisfaction that at least he had done his part; had harmed no one; had tried to help his fellow-men in his own way.

The mixture began to froth and fume violently. The gas of death must be coming out of it in large volumes now. Lockhart thought he could detect an acrid odor in the air, but how could that be? Carbon monoxide is an odorless gas! He became panicky. His mind was slipping! His imagination was running riot! Delirium was coming upon him with icy fingers of insanity! His lungs began to heave. Already the air was becoming unfit to breathe.

Sweat poured from the tortured man, his throat became dry, parched. The gag felt like a rope about his neck that was gradually drawing tighter. At times he madly bunched his muscles and strained at the bonds that held him from freedom and life. And ever and anon his eyes would encounter the beaker of fuming death, a brewpot of devillah death, to further throw his shaken mentality closer to madness.

With a last mighty, futile shudder, his body fell limp. His eyes closed slowly, and his head drooped forward. George Lockhart had lost!

# CHAPTER III DEATH

AYMOND WICKERSHAM held the colorless liquid up to the light and smiled in satisfaction. The parent substance of the light-sensitive bodies of the eye! He had made it in this last month that he had been here in Salem. It had taken him a while to get into the swing of the synthesis. Fourteen years is a long time and he found himself very rusty in the delicate methods by which these complicated and touchy compounds were made. Numerous failures to get results had worn his patience to the reaching noint at times, but finally he

had won through a complete synthesis and produced a few c.c. of the precious solution. As he went step by step through the complicated reactions recorded in the black notebook, he wondered how one man could have ever developed them. For instance, that oxidation reaction whereby the triple cvanine was produced; it was the work of genius! Reluctantly, day by day. Wickersham was forced to admit that he had killed a man far superior to himself in ability: far more worthy to live. At such times he would bolster up his ego and pacify his conscience with the contention that he had been wronged, Lockhart, had he had the least spark of humanity in him, would have saved him from the disgrace of a fourteen-year imprisonment. That was what he said out loud to himself as he worked alone in his laboratory in a secluded section of the town, but down deep within him a voice reproached him, saving he had killed a great man for a petty thing like vengeance for a misnamed wrong! At times Wickersham looked fearfully around at little creaks and tans, fearful of he knew not what. Then he would laugh at himself, Get him? Never! There wasn't a thing he had forgotten to take into account. It was a perfect fool-proof plan from beginning to end. George Lockhart was dead by unknown means and an unknown assailant. He had been somewhat disturbed on failing to find any reference to the murder in the papers, but breathed in relief as he remembered that George Lockhart had been a decided recluse, so that his death was nothing for the papers to play up. Perhaps there had been a few lines about it that had escaped his notice somewhere in their columns. Anyway, it was nothing to worry about, he told himself.

Wickersham had received from his brother enough money for him to buy this laboratory. It had been in disuse for many years, and when he first entered it, rats had scurried around, dust had risen in clouds, and cobwebs glistened in every corner and crevice. There had been a good stock of chemicals in the place and he had supplemented it with more chemicals bought with the money he had left. He had no fear of spending all he had, for he knew that the substance in that flask was worth vast sums to him when he should be ready to announce its discovery. Eagerly he had set to work on the formulae in the notebook. Tonight would be the final test to see if he had succeeded in producing the right compound. Wickersham had plenty of time. There was no hurry. He was the only one on earth with those formulae. If he had failed with this flask full, his first try to reproduce Lockhart's delicate work, he would try again, and again, till he succeeded. He must be able to run through it to put the mark of authenticity to his claim on it. Then he would go out in the world of big money and industry, and claim the vast rewards that would be his. This discovery would revolutionize the photographic industry, would reach prying fingers into cinema, astronomy, publishing, pictorial art, and would open vast new fields of research to chemists and biologists.

It was late at night. Wickersham fastened the shutters tight with a sigh of relief. He was still trembling from that vision of a face in the window ... Lockhart's face! .. to make it worse yet. Of course, it had been purely hallucination, occasioned by the strenuous work that he had been plugging away at for a month; of that Wickersham was sure. To prove that

he wasn't afraid, he had left the shutters open till now. He was closing them now because he had to exclude all light for the important tests of the compound. He set up the violet lamp and began the important and final reaction which produced the various light-sensitive bodies. The violet light dimly lighted up the table, giving the characteristic shimmering, dancing effect to everything.

Suddenly Wickersham gasped and dropped the pipette in his hand. He hardly noticed that it fell to the floor and splintered into a thousand pieces. He had seen the face . . . Lockhart's face! . . . . in the mirror-like surface of the liquid! Strange it hadn't been a pain-distorted face as he had last seen it, but a quiet, determined-looking face. With eyes closed. Wickersham fought off the craven fear of superstition that had gripped him, and tried to calm his wildly-beating heart. It was his imagination, of course .... silly imagination . . . and the strain of the work. But his eves darted again to the liquid as he reached for another pipette. It was there again!

His dark skin grew several shades lighter. Sudden fear grasped him with a grip of steel. That face was real! He slowly, fearfully lifted his eyes to the dimness of the other side of the table where the violet beams hardly were able to pierce the darkness. Then he screamed.

"Good God!....it's his ghost....
come to haunt me!" In abject, spineless fear, he sunk his head in his arms
and sobbed in mortal terror.

"Raymond Wickersham! Look up!"
The stricken man convulsed spasmodically but lacked the nerve to face the apparition.

"Wickersham . . . . I have returned from the dead as far as you're concerned. You left me to certain death."
Lockhart's tone was sepulchral and
hollow. He coughed weakly as if his
chest were very sore, and his words
came slowly.

"The perfect crime, Wickersham, yes... the perfect crime...except for two things!... one was a mistake on your part, the other was something you could not foresee."

Wickersham had gained enough control over his cowardly emotions to look up. In the pale, violet light, the figure of the man he had sent to death seemed unreal, almost like a spirit from beyond. His voice, too, sounded like a voice from the grave.

In uncontrollable fear and terror, Wickersham screamed at the vision, "My God! Please tell me... are you dead or are you alive? Oh! I can't stand this!"

"Yes, you will stand this!" returned Lockhart fiercely. "I'm alive, Wickersham, and I've got a gun here in my hand, pointed at your rotten heart! Now listen to me, you white-livered coward..."

Wickersham, somewhat heartened by the release of superstitious fears of a visitor from the world of spirits, ceased his violent trembling and looked up with a touch of bravado. After all, Lockhart had nothing on him that he could prove in court, and he doubted if he had the necessary courage in his heart to do murder. Probably he could talk him out of anything rash. He broke off his thoughts to listen to Lockhart.

"The cards were stacked against you, Wickersham, even before you attempted my life. That was the first thing wrong with your perfect crime, and, as I said before, you could do nothing about it.

"The morning of the day before you revealed your presence to me . . . .

the day, by the way, on which I first succeeded with my syntheses . . . . . . . . . . . . Mary cleaned up in my laboratory. There were two reagent bottles on my shelf with loose labels. One was OXALIC ACID and the other was AMMONIUM CHLORIDE! Her duster flicked off those loose labels and she picked up and pasted them back on the bottles, thinking she knew which came from which. Well, she was wrong and you can figure out for yourself why I didn't strangle from carbon monoxide."

Lockhart paused a moment to watch his enemy. The latter seemed to have lost his powers of movement; remained standing with a look of stupidity on his face. Lockhart went on:

"As it was, I breathed hydrochloric acid fumes all night long until Mary opened the door in the morning, and my lungs have been seared badly. The second flaw in your perfect plan was of your own doing. You told me where you were going after the crime, so confident that I would never leave that room alive!"

THE shock, these revelations brought to Wickersham, was even greater than the shock of Lockhart's presence. To think that even before he had entered the laboratory to do away with his victim, fate had already made his plans worthless, by that little incident of two loose labels! And fool ... unutterable fool ... that he had been to tell Lockhart where he was going! If he hadn't, Lockhart would not have had so easy a task to find him!

"And now, Wickersham," went on Lockhart as the other merely stared dazedly at him, totally lacking initiative now that the tables were turned, "I've come here to KILL YOU!"

"Oh, no ... for the merey of heaven ... Lockhart ... have pity on me! I'll do anything ... your notebook isn't harmed in the least ... there it is ... please ... oh! God!" Wickersham blubbered out the incoherent words as he ran out from behind the table and fell on his knees before the man he had wronged.

With a curl of scorn on his lips, Lockhart looked down at the groveling worm that had been a man. He remained silent as the coward continued his plea in more uncertain words and sobbing. Lockhart let him plead till he felt that the man was ready to collapse from fear. Then he touched him with his tee.

"Listen, Wickersham. You've got to act more like a human being . . . . get into that chair!"

With the slacrity of a slave, Wickersham crouched in the chair. Lockhart slipped a noose of rope around his middle and deftly tied him securely before the fear-blinded man knew what was happening. Only one arm was left free. Then he stepped in front of him.

"Wickersham, look at me. Notice anything different? Yes, I see you do ... I'm a changed man. That hour of torture, facing sure death, tied helpless in a chair, has snapped something in me. A few weeks ago I could not have murdered to save my soul. To-day, after that hell of waiting for death ... I feel a joy, an intense happiness that I can kill you! Now ... no more of that blubbering. You've got to face death as I did and I hope to heaven you suffer like I did! God ... that was awfu!"

Lockhart hung his head for a moment as thoughts of that similar scene came to him when he had watched with anguished eyes the beaker that was to loose death upon him. Wickersham, in the last extremity of terror, fixed his eyes on his captor with a horrible intentness, looking in his face for some sign of hope. He noticed again how that formerly kind face had changed, how lined and seamed it was. Truly, it was a different George Lockhart.

Lockhart spoke again, slowly, as if it were an effort. He coughed at times as his acid-seared lungs bothered him: "Wickersham, this is what happened after you left me tied to a chair in my laboratory, face to face with death: I had given up all hope: I watched the mixture in the beaker bubble furiously. Then, as the air became filled with fumes. I became unconscious. The few times that I regained consciousness during the night. I wondered why death was so slow in coming: why I had to suffer so long, Revived by Mary, I came to full sanity in the morning and gradually realized that I hadn't died after all. From her description of the acid fumes that nearly choked her as she opened the door, it came to me dimly that somehow carbon monoxide had not been produced. I told Mary not to mention the matter to anyone, especially not the police: that I would take care of the situation myself. Then I fell into delirium and the doctor had all he could do to keep me alive. As it is, my lungs will never be healthy again. When I was able to get out of bed three weeks later, I took a look at the bottle labeled 'Oxalic Acid' and found it to contain ammonium chloride. Conversely, the bottle labeled 'Ammonium Chloride' had in it the oxalic acid. Calling Mary, I got her to remember after some prompting that she had two days before our meeting pasted those two labels on after they had fallen to the floor. She had put them on the wrong bottles. Satisfied as to

that, my next task was to locate you. I realized that to punish you fully for your vicious crime. I would have to get to you myself; the law probably would have let you go with a light sentence, or freed you for lack of evidence against you. It may sound unreasonable, but it took me two days before I could think of the place you had mentioned you were going to. You see, Wickersham, those long minutes of waiting for death had driven almost all sane thought from my mind. and it was only by continued effort, and a mighty desire for revenge . . . . perhaps you've heard that word before. Wickersham . . . . that I finally dug it out of the chaotic impressions of that horrible night.

"Then it was a simple matter. In absolute secrecy I left my home and came here. There is only one person in this town knows I'm here, and that is a person I met on Main Street here in Salem. I stopped him and asked him, where there was a laboratory in town. He gave me the directions and asked me if I knew you. I said, 'Yes,' I was your new assistant. It is dark to-night, so he couldn't see me well. He doesn't know where I'm from or who I am, so, you see, Wickersham, this plan of mine is just as perfect as yours, and I'm going to make it still more perfect. But to go on with the story: I arrived here at the laboratory about two hours ago. I looked in your window and saw you alone, Then I waited till a few minutes ago so that if I had to shoot you if you resisted, no one would be up to hear the shot. The nearest house is far enough away so that the sound will not carry to the occupants. I crept in through the storeroom window, knowing the front door would be locked, picked up this rone I've tied you with, and waited till you turned out the lights and worked with the violet lamp. I presume you've finally managed to follow through my syntheses. Well, Wickersham, at least you have the distinction of being the second man in the world to produce the compound that I've given five years of my life to, even if you had the bad luck to miss the chance of being credited with its discovery.

"Now, Wickersham . . . I'm going to kill you, because I could never
see you get the punishment you deserve in a court-of-law, and no one
will be the wiser if I take the law into
my own hands. But I'm going to do
one thing that will safeguard me from
your vengeance JUST IN CASE you
don't die! That was something you
forgot when you tried to kill me."

Wickersham sat with a deathlike silence and immobility. Even the repeated threats of death failed to stir him. He had suffered a shock that had deprived him of any sort of voluntary movement.

"Now listen carefully, Wickersham, I was a peaceable man. I loved my work. I loved my way of living, I was happy and contented. Then you came with your cruel thoughts of revenge against the man who had been the victim of circumstances in your sentence to prison, subjected me to unspeakable torment; and there sprang up in me a spark of something that had not been there before! I DETERMINED TO KILL TO AVENGE!"

LOCKHART stood over the pale man like an executioner, his face a seething mask of fierce murder-lust. His sensitive nostrils quivered and the finger on the trigger trembled, as he thundered those words of death at the cowering Wickersham. Then he suddenly changed. He deflated from

his tempestuous, emotional storm like a balloon with the valve open. In a much quieter voice he continued:

"But now, Wickersham, when I have you in my power, my conscience is at work: my better nature is fighting within me. While my fingers itch to pull the trigger and send you to death, my inborn mercifulness tells me to have that nity that you had none of, Wickersham, I'm going to give you a one to one chance of life. Now . . . . never mind interrupting . . . . listen to me till I'm done. I'm going to prepare two solutions: one of potassium cvanide and one of pure water. I'm going to give you your choice . . . . death or life! If you choose the water, you are free to live. If you choose the other . . . finis.

"Now, one more thing. I have here a statement written out that you have attempted to murder me, You will sign at the bottom. If you live you will have no further chance to kill me, because that paper, signed with your name, and deposited in my personal box at my bank, will immediately point you out as the murderer, if I am found dead. You will sign this paper because you have no choice. If you refuse. I will shoot you on the spot, as I fully intended to do when I first came in here. It is just my extreme compassion, my desire to do what is fair, that is giving you this one chance to live. Sign!"

Lockhart drew forth a paper, stating that Raymond Wickersham had
once attempted the life of George
Lockhart, and that if the latter be
found dead, the former is to be questioned in that connection. With his
free hand, Wickersham signed, his
trembling fingers hardly able to hold
the pen Lockhart handed him.

That done, Lockhart pocketed the paper. Then he carefully blindfolded Wickersham. In a few minutes he had prepared the two solutions and placed them on a porcelain plate. He removed the blindfold.

"Here. Wickersham, are two solutions: one of dilute potassium cyanide which kills in thirty seconds, and the other of plain water. The former is so dilute that you will not be able to detect its characteristic odor, but it is concentrated enough to kill. Take your pick and gulp it down in one gulp, for, by God, if you try to taste of it, or if you throw it away. I'll send a bullet through your brain the next instant! This is the chance you never gave me . . . , life or death . . . , you will immediately know which you've got, after you swallow it, by the characteristic taste of the cvanide."

Lockhart stood in front of Wickersham with the plate. The two beakers looked exactly alike, filled with clear, colorless liquids. With his free hand clenched tightly on the arm of the chair so that the knuckles showed white, Wickersham shifted his eyes from one to the other. Which should he take? Which held the deadly poison, which the pure water? Lockhart looked on with a grim smile.

Wickersham stretched forth a shaky hand and then drew it back in anguish. "I can't, Lockhart... I can't," he moaned. All the coward in him sprang to the front in this crucial moment

"CHOOSE!" thundered Lockhart.
"If you don't choose in ten seconds,
I'll shoot!" He turned his eyes on the
wrist-watch on the hand holding the
gun.

Five long seconds passed before Wickersham put forth a hand. After a split second of hesitation, he chose one beaker and brought it slowly to his blue lips. The liquid seemed to dance in the violet light, mocking him. Lockhart waved his pistol suggestively.

In a sudden, savage gesture, Wickersham tossed the liquid down his throat.

The stricken man's eyes rolled, clouded, and closed. His body went limp and his head sagged forward.

"Whew!" said Lockhart out loud as he pulled out his handkerchief and wiped a damp forehead. "I'm glad that's over! I couldn't have stood that much longer. If he had called my bluff...? Kill him? Couldn't he see it was all an act on my part? I just wanted to see him suffer a small part of the way I suffered at his hands. Ha! ha! ha! Now look at him, fainted from fright! What a coward he is. I wanted to make sure that whichever he picked, they'd both taste saity, so I put sodium chloride in both."

Finally Lockhart got some control of himself and continued his monologue: "Yes, I just wanted to see him suffer the agonies of approaching death. I could no more have killed him in cold blood than the man in the moon, for all of his attempt at my life. Well, I'm safe from him now forever and a day. This confession in my pocket will keep him away. If I'm ever found dead under unnatural circumstances, the finger of guilt will point right to him. That's all I wanted! And I told him I'd kill him! Why if he had refused to drink, I wouldn't have known what to do next to save my face!"

"I think what I'll do now is pick up my notebook, write a short note explaining why he isn't dead when he reads it, and leave while I've got the chance. This affair is getting on my nerves. The sooner I get away from here the better."

Lockhart snapped on the lights. He found his precious notebook and pocketed it. As he passed Wickersham something in his appearance made him pause.

A flurry of fear gripped his heart.
Calling himself a fool for doing it,
Lockhart felt for his pulse. He
dropped the limp wrist and with a
wildly beating heart, picked up a mirror on the table and carefully held it
under Wickersham's nosersham's nose

The mirror clattered to the floor as it dropped out of Lockhart's nerveless fingers. He backed away from the body slowly.

"My God!" he said softly, "He IS

THE END



# Shifting Seas

# By STANLEY G. WEINBAUM

A sad touch in connection with this story is the lamented death of the author, who was so popular while he lived. We believe this story is specially interesting as twicel of the writer.

I T developed later that Ted Welling was one of the very few eye-witnesses of the catastrophe, or rather, that among the million and a half eye-witnesses, he was among the half dozen that survived. At the time, he was completely unaware of the extent of the disaster, although it looked bad enough to him in all truth!

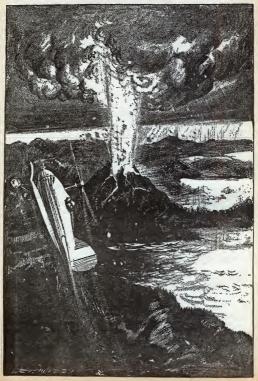
He was in a Colquist gyro, just north of the spot where Lake Nicaragua drains its brown overflow into the San Juan, and was bound for Managua, seventy-five miles north and west across the great inland sea. Below him, quite audible above the muffled whir of his motor, sounded the intermittent clicking of his tripanoramic camera, adjusted delicately to his speed so that its pictures could be assembled into a beautiful relief map of the terrain over which he passed, That, in fact, was the sole purpose of his flight; he had left San Juan del Norte early that morning to traverse the route of the proposed Nicaragua Canal, flying for the Topographical branch of the U.S. Geological Survey. The United States, of course, had owned the rights to the route since early in the centurya safeguard against any other nation's aspirations to construct a competitor for the Panama Canal.

Now, however, the Nicaragua

Canal was actually under consideration. The overburdened ditch that crossed the Isthmus was groaning under the traffic of the 1940's, and it became a question of either cutting the vast trench another eighty-five feet to sea-level or of opening an alternate passage. The Nicaragua route was feasible enough; there was the San Juan emptying from the great lake into the Atlantic, and there was Lake Managua a dozen miles or so from the Pacific. It was simply a matter of choice, and Ted Welling, of the Topographical Service of the Geological Survey, was doing his part to aid the choice.

At precisely 10:40 it happened. Ted was gazing idly through a faintly misty morning toward Ometepee, its cone of a peak plumed by dusky smoke. A hundred miles away, across both Lake Nicaragua and Lake Managua, the fiery mountain was easily visible from his altitude. All week, he knew, it had been rumbling and smoking, but now, as he watched it, it burst like a mighty Roman candle.

There was a flash of white fire not less brilliant than the sun. There was a column of smoke with a red core that spouted upward like a fountain and then mushroomed out. There was a moment of utter silence in which the camera clicked methodically, and



There was a flash of white fire not less brilliant than the sun. There was a column of smoke with a red core that spouted upward like a fountain and then mushroomed out.

then there was a roar as if the very roof of Hell had blown away to let out the bellows of the damned!

Ted had one amazed thought-the sound had followed too quickly on the eruntion! It should have taken minutes to reach him at that distance. and then his thoughts were forcibly diverted as the Colquist tossed and skittered like a leaf in a hurricane. He caught an astonished glimpse of the terrain below, of Lake Nicaragua heaving and boiling as if it were the seas that lash through the Straits of Magellan instead of a body of landlocked fresh water. On the shore to the east a colossal wave was breaking, and there in a banana grove frightened figures were scampering away. And then, exactly as if by magic, a white mist condensed about him, shutting out all view of the world below.

He fought grimly for altitude. He had had three thousand feet, but now, tossed in this wild ocean of fog. of up-drafts and down-drafts, of pockets and humps, he had no idea at all of his position. His altimeter needle quivered and jumped in the changing pressure, his compass spun, and he had not the vaguest conception of the direction of the ground. So he struggled as best he could, listening anxjously to the changing whine of his blades as strain grew and lessened. And below, deep as thunder, came intermittent rumblings that were, unless he imagined it, accompanied by the flash of jagged fires.

Suddenly he was out of it. He burst abruptly into clear air, and for a horrible instant it seemed to him that he was actually flying inverted. Apparently below him was the white sea of mist; and above was what looked at first glance like dark ground, but a moment's scrutiny revealed it as a

world-blanketing canopy of smoke or dust, through which the sun shone with a fantastic blue light. He had heard of blue suns, he recalled; they were one of the rarer phenomena of volcanic eruptions.

His altimeter showed ten thousand. The vast plain of mist heaved in gi-gantic ridges like rolling waves, and he fought upward away from it. At twenty thousand the air was steadier, but still infinitely above was the sullen ceiling of smoke. Ted leveled out, turning at random north-east, and relaxed.

"Whew!" he breathed. "What-

He couldn't land, of course, in that impenetrable fog. He flew doggedly north and east, because there was an airport at Bluefields, if this heaving sea of white didn't blanket it.

But it did. He had still half a tank of fuel, and he bored grimly north. Far away was a pillar of fire, and beyond it to the right, another and a third. The first, of course, was Ometepec, but what were the others? Fuego and Tajumulco? It seemed impossible.

Three hours later the fog was still below him, and the grim roof of smoke was dropping as if to crush him between. He was going to have to land soon; even now he must have spanned Nicaragua and be somewhere over Honduras. With a sort of desperate calm he slanted down toward the fog and plunged in. He expected to crash; curiously, the only thing he really regretted was dying without a chance to say goodbye to Kay Lovell, who was far off in Washington with her father, old Sir Joshua Lovell, Ambassador from Great Britain since 1941.

When the needle read two hundred, he leveled off—and then, like a train bursting out of a tunnel, he came clear again! But under him was wild and raging ocean, whose waves seemed almost to graze the ship. He spun along at a low level, wondering savagely how he could possibly have wandered out to sea. It must, he supposed, be the gulf of Honduras.

He turned west. Within five minutes he had raised a storm-lashed coast, and then—miracle of all miracles!—a town! And a landing field. He pancaked over it, let his vanes idle, and dropped as vertically as he could in that volley of gusty winds.

It was Belize in British Honduras. He recognized the port even before the attendants had reached him.

"A Yankee!" yelled the first. "Ain't it Yankee luck for you?"

Ted grinned. "I needed it. What happened?"

"The roof over this part of Hell blew off. That's all."

"Yeah, I saw that much, I was over it."

"Then you know more'n any of us. Radio's dead and there ain't no bloomin' telegraph at all."

It began to rain suddenly, a ferce, pattering rain with drops as big as marbles. The men broke for the shelter of a hangar, where Ted's information, meager as it was, was avidly seized upon, for sensational news is rare below the Tropic of Cancer. But none of them yet realized just how sensational it was.

IT was three days before Ted, and the rest of the world as well, began to understand in part what had happened. This was after hours of effort at Belize had finally raised Havana on the beam, and Ted had reported through to old Asa Gaunt, his chief at Washington. He had been agreeably surprised by the promptness of the reply ordering him instantly to the Capital; that meant a taste of the pleasant life that Washington reserved for young departmentals, and most of all, it meant a glimpse of Kay Lovell after two months of letter-writing. So he had flown the Colquist gayly across Yucatan Channel, left it at Havana, and was now comfortably settled in a huge Caribbean plane bound for Washington, boring steadily north through a queerly misty mid-October morning.

At the moment, however, his thoughts were not on Kay. He was reading a grim newspaper account of the catastrophe, and wondering what thousand-to-one shot had brought him unscathed through the very midst of it. For the disaster overshadowed into insignificance such little disturbances as the Yellow River flood in China, the eruption of Krakatoa, the holocaust of Mont Pelee, or even the great Japanese earthquake of 1923, until now the most terrible visitation ever inflicted on a civilized rac a civilized rac inflicted on a civilized rac inflicted rac inflicted rac inflicted rac inflicted rac inflicted rac inflicted rac

For the Ring of Fire, that vast volcanic circle that surrounds the Pacific Ocean, perhaps the last unhealed scars of the birth-throes of the Moon, had burst into fiame. Aniakchak in Alaska had blown its top away, Fujiyama had vomiked lava, on the Atlantic side La Soufriere and the terrible Pelce had awakened arain.

But these were minor. It was at the two volcanic foci, in Java and Central America, that the fire-mountains had really shown their powers. What had happened in Java was still a mystery, but on the Isthmus—that was already too plain. From Mosquito Bay to the Rio Coco, there was—ocean! Half of Panama, seven-eighths of Nicaragua—and as for Costa Rica, that country was as if it had never been. The Canal was a wreck, but

Ted grinned a wry grin at the thought that it was now as unnecessary as a pyramid. North and South America had been cut adrift, and the Isthmus, the land that had once known Atlantis, had gone to join it.

IN Washington Ted reported at once to Asa Gaunt. That dry Texan questioned him closely concerning his experience, grunted disgustedly at the paucity of information, and then ordered him tersely to attend a meeting at his office in the evening. There remained a full afternoon to devote to Kay, and Ted lost little time in so devoting it.

He didn't see her alone. Washington, like the rest of the world, was full of the excitement of the earthquake, but in Washington more than elsewhere the talk was less of the million and a half deaths and more largely of the other consequences. After all, the bulk of the deaths had been among the natives, and it was a sort of remote tragedy, like the perishing of so many Chinese. It affected only those who had friends or relatives in the stricken region, and these were few in number.

But at Kay's home Ted encountered an excited group arguing physical results. Obviously, the removal of the bottleneck of the Canal strengthened the naval power of the United States enormously. No need now to guard the vulnerable Canal so intensively. The whole fleet could steam abreast through the four hundred mile gap left by the subsidence. Of course the country would lose the revenues of the toll-charges, but that was balanced by the cessation of the expense of fortifying and guarding.

Ted fumed until he managed a few moments of greeting with Kay alone. Once that was concluded to his satisfaction, he joined the discussion as eagerly as the rest. But no one even considered the one factor in the whole catastrophe that could change the entire history of the world.

A T the evening meeting Ted stared around him in surprise. He recognized all those present, but the reasons for their presence were obscure. Of course there was Asa Gaunt, head of the Geological Survey, and of course there was Golsborough, Secretary of the Interior, because the Survey was one of his departments. But what was Maxwell, joint Secretary of War and the Navy, doing there? And why was silent John Parrish, Secretary of State, frowning down at his shoes in the corner?

Asa Gaunt cleared his throat and began, "Do any of you like eels?" he asked soberly.

There was a murmur. "Why, I do," said Golsborough, who had once been Consul at Venice. "What about it?"

"This—that you'd better buy some and eat 'em tomorrow. There won't be any more eels."

"No more eels?"

"No more eels. You see, eels breed in the Sargasso Sea, and there won't be any Sargasso Sea."

"What is this?" growled Maxwell.
"I'm a busy man. No more Sargasso
Sea, huh!"

"You're likely to be busier soon," said Asa Gaunt dryly. He frowned.
"Let me ask one other question. Does anyone here know what spot on the American continent is opposite London. England?"

Golsborough shifted impatiently, "I don't see the trend of this, Asa," he grunted, "but my guess is that New York City and London are nearly in the same latitude. Or maybe New York's a little to the north, since I know its climate is somewhat colder."

"Hah!" said Asa Gaunt. "Any disagreement?"

There was none. "Well," said the head of the Survey, "you're all wrong, then. London is about one thousand miles north of New York. It's in the latitude of southern Labrador!"

"Labrador! That's practically the Arctic!"

As a Gaunt pulled down a large map on the wall behind him, a Mercator projection of the world.

"Look at it," he said. "New York's in the latitude of Rome, Italy. Washington's opposite Naples. Norfolk's level with Tunis in Africa, and Jacksonville with the Sahara Desert. And gentlemen, these facts lead to the conclusion that next summer is going to see the wildest war in the history of the world!"

Even Ted, who knew his superior well enough to swear to his sanity, could not resist a glance at the faces of the others, and met their eyes with full understanding of the suspicion in them.

Maxwell cleared his throat, "Of course, of course," he said gruffly. "So there'll be a war and no more eels. That's very easy to follow, but I believe I'll ask you gentlemen to excuse me. You see, I don't care for eels."

"Just a moment more," said Asa Gaunt. He began to speak, and little by little a grim understanding dawned on the four he faced.

TED remained after the appalled and sobered group had departed. His mind was too chaotic as yet for other occupations, and it was already too late in the evening to find Kay, even had he dared with these oppressive revelations weighing on him.

"Are you sure?" he asked nervouslv. "Are you quite certain?"

"Well, let's go over it again," grunted Asa Gaunt, turning to the map. He swept his hand over the white lines drawn in the Pacific Ocean. "Look here. This is the Equatorial Counter Current, sweeping east to wash the shores of Guatemala, Salvador, Honduras, Nicaragua, Costa Rica, and Panama."

"I know. I've flown over every

square mile of that coast."

"Uh." The older man turned to the blue-mapped expanse of the Atlantic. "And here," he resumed, "is the North Equatorial Drift, coming west out of the Atlantic to sweep around Cuba into the Gulf, and to emerge as-the Gulf Stream. It flows at an average speed of three knots per hour, is sixty miles broad, a hundred fathoms deep, and possesses, to start with, an average temperature of 50. And here"he jabbed a finger at Newfoundland-"it meets the Labrador Current and turns east to carry warmth to all of Western Europe, That's why England is habitable; that's why southern France is semi-tropical: that's why men can live even in Norway and Sweden, Look at Scandinavia, Ted: it's in the latitude of central Greenland, level with Baffin Bay, Even Eskimos have difficulty scraping a living on Baffin Island."

"I know," said Ted in a voice like a groan. "But are you certain about-

the rest of this?"

"See for yourself," growled Asa, Gaunt. "The barrier's down now. The Equatorial Counter Current, moving two knots per hour, will sweep right over what used to be Central America and strike the North Equatorial Drift just south of Cuba. Do you see what will happen—is happening—to the Gulf Stream? Instead of moving

north-east along the Atlantic coast, it will flow almost due east, across what used to be the Sargasso Sea. Instead of bathing the shores of Northern Europe, it will strike the Spanish peninsula, just as the current called the West Wind Drift does now, and instead of veering north it will turn south, along the coast of Africa. At three knots an hour it will take less than three months for the Gulf Stream to deliver its last gallon of warm water to Europe. That brings us to January, 1945—and after January, what?"

Ted said nothing.

"Now," resumed Asa Gaunt grimly, "the part of Europe occupied by countries dependent on the Gulf Stream consists of Norway, Sweden, Denmark, Germany, the British Isles. the Netherlands, Belgium, France, and to a lesser extent. Poland. Lithuania, Latvia, Esthonia, and Finland. Before six months have passed. Ted. you're going to see a realignment of Europe. The Gulf Stream countries are going to be driven together: Germany and France are suddenly going to become bosom friends, and France and Russia, friendly as they are today, are going to be bitter enemies. Do you see why?"

"N-no."

"Because the countries I've named now support over two hundred million inhabitants. Two hundred million, Ted! And without the Gulf Stream, when England and Germany have the climate of Labrador, and France of Newfoundland, and Scandinavia of Baffin Land—how many people can those regions support then? Three or four million, perhaps, and that with difficulty. Where will the others go?"

"Where?"

"I can tell you where they'll tru to

go. England will try to unload its surplus population on its colonies. India's hopelessly overrowded, but South Africa, Canada, Australia, and New Zealand can absorb some. About twenty-five of its fifty millions, I should estimate, because Canada's a northern country and Australia desert in a vast part of it. France has Northern Africa, already nearly as populous as it can be. The others—well, you guess, Ted.

"I will. Siberia, South America, and

-the United States!"

"A good guess. That's why Russia and France will no longer be the best of friends. South America is a skeleton continent, a shell. The interior is unfit for white men, and so—it leaves Sibera and North America. What a war's in the making!"

"It's almost unbelievable!" muttered Ted. "Just when the world seemed to be settling down, too."

"Oh, it's happened before," observed Asa Gaunt. "This isn't the only climatic change that brought on war. It was decreasing rainfall in central Asia that sent the Huns socuring Europe, and probably the Goths and Vandals as well. But it's never happened to two hundred million civilized people before!" He paused. "The newspapers are all shrieking about the million and a half deaths in Central America. By this time next year they'll have forgotten that a million and a half deaths ever rated a head-line!"

"But good Lord!" Ted burst out.
"Isn't there anything to be done about it?"

"Sure, sure," said Asa Gaunt. "Go find a nice tame earthquake that will raise back the forty thousand square . miles the last one sunk. That's all you have to do, and if you can't do that, Maxwell's suggestion is the next best: build submarines and submarines. They can't invade a country if they can't get to it."

A SA GAUNT was beyond doubt A the first man in the world to realize the full implications of the Central American disaster, but he was not very much ahead of the brilliant Sir Phineas Grev of the Royal Society, Fortunately (or unfortunately, depending on which shore of the Atlantic vou call home), Sir Phineas was known to the world of journalism as somewhat of a sensationalist, and his warning was treated by the English and Continental newspapers as on a par with those recurrent predictions of the end of the world. Parliament noticed the warning just once, when Lord Rathmere rose in the Upper House to complain of the unseasonably warm weather and to suggest dryly that the Gulf Stream be turned off a month early this year. But now and again some oceanographer made the inside pages by agreeing with Sir Phineas.

So Christmas approached very quietly, and Ted, happy enough to be stationed in Washington, spent his days in routine topographical work in the office and his evenings, as many as she permitted, with Kay Lovell. And she did permit an increasing number, so that the round of gaiety during the holidays found them on the verge of engagement. They were engaged so far as the two of them were concerned, and only awaited a propitious moment to inform Sir Joshua, whose approval Kay felt, with true Engilsh conservatism, was necessity.

Ted worried often enough about the dark picture Asa Gaunt had drawn, but an oath of secrecy kept him from ever mentioning it to Kay. Once, when she had casually brought up the subject of Sir Phineas Grey and his warning, Ted had stammered some inanity and hastily switched the subject. But with the turn of the year and January, things began to change.

It was on the fourteenth that the first taste of cold struck Europe. London shivered for twenty-four hours in the unheard-of temperature of twenty below zero, and Paris argued and gesticulated about its grands froids. Then the high pressure area moved eastward and normal temperatures returned.

But not for long. On the twentyfirst another zone of frigid temperature came drifting in on the Westerlies, and the English and Continental papers, carefully filed at the Congressional Library, began to betray a note of panic. Ted read the editorial comments avidly: of course Sir Phineas Grev was crazy: of course he wasbut just suppose he were right. Just suppose he were. Wasn't it unthinkable that the safety and majesty of Germany (or France or England or Belgium, depending on the particular capital whence the paper came) was subject to the disturbances of a little strip of land seven thousand miles away? Germany (or France, et al) must control its own destiny,

With the third wave of Arctic cold, the tone became openly fearful. Perhaps Sir Phineas was right. What then? What was to be done? There were rumblings and mutterings in Paris and Berlin, and even staid Oslo witnessed a riot, and conservative London as well. Ted began to realize that Asa Gaunt's predictions were founded on keen judgment; the German government made an openly friendly gesture toward France in the delicate matter of the Polish Corridor, and France reciprocated with an indulgent note on the Saar payments.

Russia protested and was politely ignored; Europe was definitely realigning itself, and in desperate haste.

But America, save for a harassed group in Washington, had only casual interest in the matter. When reports of suffering among the poor began to come during the first week in February, a drive was launched to provide relief funds, but it met with only nominal success. People just weren't interested; a cold winter lacked the dramatic power of a flood, a fire, or an earthquake. But the papers reported in increasing anxiety that the immigration quotas, unapproached for a half a dozen years, were full again: there was the beginning of an exodus from the Gulf Stream countries.

By the second week in February stark panic had gripped Europe, and echoes of it began to penetrate even self-sufficient America. The realignment of the Powers was definite and open now, and Spain, Italy, the Balkans, and Russia found themselves herded together, facing an ominous thunderhead on the north and west. Russia instantly forgot her longstanding quarrel with Japan, and Japan, with a protective eye on the plains of Manchoukuo, was willing enough to forget her own grievances. There was a strange shifting of sympathies; the nations which possessed large and thinly populated areas-Russia, the United States, Mexico, and all of South America-were glaring back at a frantic Europe that awaited only the release of summer to launch a greater invasion than any history had recorded. Attila and his horde of Huns-the Mongol waves that heat down on China-even the vast movements of the white race into North and South America-all these were but minor migrations to that

which threatened now. Two hundred million people, backed by colossal fighting power, glaring panic-stricken at the empty places of the world. No one knew where the thunderbolt would strike first, but that it would strike was beyond doubt.

WHILE Europe shivered in the grip of an incredible winter, Ted shivered at the thought of certain personal problems of his own. The frantic world found an echo in his own situation, for here was he, America in miniature, and there was Kay Lovell, a small edition of Britannia. Their sympathies clashed like those of their respective nations.

The time for secrecy was over. Ted faced Kay before the fireplace in her home and stared from her face to the cheery fire, whose brightness merely accentuated his gloom.

"Yeah," he admitted. "I knew about it. I've known it since a couple of days after the Isthmus earthquake."

"Then why didn't you tell me? You should have."

"Couldn'f. I swore not to tell."

"It isn't fair!" blazed Kay. "Why should it fall on England? I tell you it sickens me even to think of Merceroft standing there in snow, like some old Norse tower. I was born in Warwickshire, Ted, and so was my father, and his father, and

"I'm sorry," said Ted gently, "but what can I—or anyone—do about it? I'm just glad you're here on this side of the Atlantic, where you're safe."

"Safe!" she flashed. "Yes, I'm safe, but what about my people? I'm safe because I'm in America, the lucky country, the chosen land! Why did this have to happen to England? The Gulf Stream washes your shores too. Why aren't Americans shivering and freezing and frightened and hopeless, instead of being warm and comfortable and indifferent? Is that fair?"

"The Gulf Stream," he explained miserably, "doesn't affect our climate so definitely because in the first place we're much farther south than Europe and in the second place our prevailing winds are from the west, just as England's. But our winds blow from the land to the Gulf Stream, and England's from the Gulf Stream to the land."

"But it's not fair! It's not fair!"
"Can I help it. Kay?"

"Oh, I suppose not," she agreed in suddenly weary tones, and then, with a resurgence of anger, "But your people can do something about it! Look here! Listen to this!"

She seized a week-old copy of the London Times, fingered rapidly through it, and turned on Ted, "Listen-just listen! 'And in the name of humanity it is not asking too much to insist that our sister nation open her gates to us. Let us settle the vast areas where now only Indian tribes hunt and buffalo range. We would not be the only ones to gain by such a settlement, for we would bring to the new country a sane, industrious, lawabiding citizenry, no harborers of highwaymen and gangsters-a point well worth considering. We would bring a great new purchasing public for American manufacturers, carrying with us all our portable wealth. And finally, we would provide a host of eager defenders in the war for territory, a war that now seems inevitable. Our language is one with theirs; surely this is the logical solution, especially when one remembers that the state of Texas alone contains land enough to supply two acres to every man, woman, and child on earth!" She paused and stared defiantly at Ted. "Well!"

He snorted. "Indians and buffalo!" he snapped. "Have you seen either one in the United States?"

"No, but-"

"And as for Texas, sure there's enough land there for two acres to everybody in the world, but why didn't your editor mention that two acres won't even support a cow over much of it? The Llano Estacado's nothing but an alkali desert, and there's a scarcity of water in lots of the rest of it. On that argument, you ought to move to Greenland; I'll bet there's land enough there for six acres per person!"

"That may be true, but-".

"And as for a great new purchasing public, your portable wealth is gold and paper money, isn't it? The gold's all right, but what good is a pound if there's no British credit to back it? Your great new -public would simply swell the ranks of the unemployed until American industry could absorb them, which might take years! And meanwhile wages would go down to nothing because of an enormous surplus of labor, and food and rent would go skyhigh because of millions of extra stomachs to feed and bodies to shelter."

"All right!" said Kay bleakly. "Argue all you wish. I'll even concede that your arguments are right, but there's one thing I know is wrong, and that's leaving fifty million English people to starve and freeze and suffer in a country that's been moved, as far as climate goes, to the North Pole. Why, you even get excited over

a newspaper story about one poor family in an unheated hovel! Then what about a whole nation whose furnace has gone out?"

"What," countered Ted grimly, "about the seven or eight other nations whose furnaces have also gone out ?"

"But England deserves priority!" she blazed. "You took your language from us, your literature, your laws, your whole civilization. Why, even now you ought to be nothing but an English colony! That's all you are, if you want the truth!"

"We think differently, Anyway, you know as well as I that the United States can't open the door to one nation and exclude the others. It must he all or none and that means-

none!"

"And that means war." she said bitterly, "Oh, Ted! I can't help the way I feel, I have people over thereaunts, cousins, friends. Do you think I can stand indifferently aside while they're ruined?-Although they're ruined already, as far as that goes, Land's already dropped to nothing there. You can't sell it at any price now"

"I know, I'm sorry, Kay, but it's no one's fault. No one's to blame."

"And so no one needs to do anything about it. I suppose, Is that your nice Ameri. theory?"

"You know that isn't fair! What can we do?"

"You could let us in! As it is we'll have to fight our way in, and you can't blame us!"

"Kay, no nation and no group of nations can invade this country. Even if our navy were utterly destroyed. how far from the sea do you think a hostile army could march? It would be Napoleon in Russia all over again: your army marches in and is swal-

lowed up. And where is Europe going to find the food to support an invading army? Do you think it could live on the land as it moved? I tell you no sane nation would try that!"

"No sane nation, perhaps!" she retorted fiercely, "Do you think you're dealing with sane nations?"

He shrugged gloomily.

"They're desperate!" she went on. "I don't blame them Whatever they do, you've brought it on yourselves. Now you'll be fighting all of Europe. when you could have the British navy on your side. It's stupid. It's worse than stunid: it's selfish!"

"Kay," he said miserably, "I can't argue with you. I know how you feel, and I know it's a hell of a situation. But even if I agreed with everything vou've said-which I don't-what could I do about it? I'm not the President and I'm not Congress Let's dron the argument for this evening, honey: it's just making you unhappy."

"Unhappy! As if I could ever be anything else when everything I value, everything I love, is doomed to be buried under Arctic snow."

"Everything, Kay?" he asked gently. "Haven't you forgotten that there's something for you on this side of the Atlantic as well?"

"I haven't forgotten anything," she said coldly. "I said everything, and I mean it. America! I hate America. Yes, and I hate Americans too!"

"Kav!"

"And what's more," she blazed, "I wouldn't marry an American if heif he could rebuild the Isthmus! If England's to freeze, I'll freeze with her, and if England's to fight, her enemies are mine!"

She rose suddenly to her feet, deliberately averted her eyes from his troubled face, and stalked out of the room.

COMETIMES, during those hectic weeks in February, Ted wormed his way into the Visitor's Gallery in one or the other Congressional house. The out-going seventy-ninth Congress, due to stand for re-election in the fall, was the focal point of the dawning hysteria in the nation, and was battling sensationally through its closing session. Routine matters were ignored, and day after day found both houses considering the unprecedented emergency with a sort of appalled inability to act in any effective unison. Freak bills of all description were read, considered, tabled, reconsidered, put to a second reading, and tabled again. The hard-money beem of '42 had swept in a Conservative majority in the off-year elections, but they had no real policy to offer, and the proposals of the minority group of Laborites and Leftists were voted down without substitutes being suggested.

Some of the weirdest bills in all the weird annals of Congress appeared at this time. Ted listened in fascination to the Leftist proposal that each American family adopt two Europeans, splitting its income into thirds: to a suggestion that Continentals be advised to undergo voluntary sterilization, thus restraining the emergency to the time of one generation: to a fantastic paper money scheme of the Senator from the new state of Alaska. that was to provide a magic formula to permit Europe to purchase its livelihood without impoverishing the rest of the world. There were suggestions of outright relief, but the problem of charity to two hundred million people was so obviously staggering that this proposal at least received little attention. But there were certain bills that passed both houses without debate. gaining the votes of Leftists, Laborites, and Conservatives alike; these were the grim appropriations for submarines, and aircraft-carriers.

Those were strange, hectic days in Washington, Outwardly there was still the same gay society that gathers like froth around all great capitals, and Ted, of course, being young and decidedly not unattractive, received his full share of invitations. But not even the least sensitive could have overlooked the dark undercurrents of hysteria that flowed so little a way beneath the surface. There was dancing, there was gay dinner conversation, there was laughter, but beneath all of it was fear. Ted was not the only one to notice that the diplomatic representatives of the Gulf Stream countries were conspicuous by their absence from all affairs save those of such importance that their presence was a matter of policy. And even then, incidents occurred; he was present when the Minister from France stalked angrily from the room because some hostess had betrayed the poor taste of permitting her dance orchestra to play a certain popular number called "The Gulf Stream Blues." Newspapers carefully frained from mentioning the currence, but Washington buzzed with it for days.

Ted looked in vain for Kay. Her father appeared when appearance was necessary, but Ted had not seen the girl since her abrupt dismissal of him, and in reply to his inquiries, Sir Joshua granted only the gruff and double-edged explanation that she was "indisposed." So Ted worried and fumed about her in vain, until he scarcely knew whether his own situation or that of the world was more important. In the last analysis, of course, the two were one and the same.

The world was like a crystal of nitrogen iodide, waiting only the drying-out of summer to explode. Strict censorship had veiled what was happening in Germany, but the news darting on wire and ether wave from the other countries was more than alarming. Under its frozen surface Europe was seething like Mounts Erebus and Terror that blaze in the ice of Antarctica, Little Hungary had massed its army on the west, beyond doubt to oppose a similar massing on the part of the Anschlüs. Of this particular report. Ted heard Maxwell say with an air of relief that it indicated that Germany had turned her face inland: it meant one less potential enemy for America.

But the maritime nations were another story, and especially mighty Britain, whose world-girdling fleet was gathering day by day in the Atlantic. That was a crowded ocean indeed, for on its westward shore was massed the American battle fleet, built at last to treaty strength, and building even beyond it, while north and south plied every vessel that could raise a pound of steam, bearing those fortunates who could leave their European homes to whatever lands hope called them. Africa and Australia, wherever Europe had colonies, were receiving an unheard of stream of immigrants. But this stream was actually only the merest trickle, composed of those who possessed sufficient liquid wealth to encompass the journey, Untold millions remained chained to their homes, bound by the possession of unsalable lands, or by investments in business, or by sentiment, or by the simple lack of sufficient funds to buy passage for families. And throughout all of the afflicted countries were those who clung stubbornly to hope, who believed even in the

grip of that unbelievable winter that the danger would pass, and that things would come right in the end.

Blunt, straightforward little Holland was the first nation to propose openly a wholesale transfer of population. Ted read the note, or at least the version of it given the press on February 21st. In substance it simply repeated the arguments Kay had read from the London paper-the plea to humanity, the affirmation of an honest and industrious citizenry, and the appeal to the friendship that had always existed between the two nations; and the communication closed with a request for an immediate reply because of "the urgency of the situation." And an immediate reply was forthcoming.

This was also given to the press. In sueve and very polished diplomatic language it pointed out that the United States could hardly admit nationals of one country while excluding those of others. Under the terms of the National Origins Act, Dutch immigrants would be welcomed to the full extent of their quota. It was even possible that the quota might be increased, but it was not conceivable that it could be removed entirely. The note was in effect a suave, dignified, diplomatic No.

M ARCH drifted in on a southwest brought spring, and in Washington a faint forerunner of balmy weather to come, but to the Gulf Stream countries it brought no release from the Arctic winter that had fallen on them with its icy mantle. Only in the Basque country of Southern France, where vagrant winds slipped at intervals across the Pyrenees with the warm breath of the deflected Stream, was there any sign of the relaxing of that

frigid clutch. But that was a promise; April would come, and May—and the world flexed its steel muscles for war.

Everyone knew now that war threatened. After the first few notes and replies, no more were released to the press, but everyone knew that notes, representations, and communiques were fiying between the powers like a flurry of white doves, and everyone knew, at least in Washington, that the tenor of these notes was no longer dove-like. Now they carried brusque demands and blunt refusals.

Ted knew as much of the situation as any alert observer, but no more. He and Asa Gaunt discussed it end-lessly, but the dry Texan, having made his predictions and seen them verified, was no longer in the middle of the turmoil, for his bureau had, of course, nothing to do with the affair now. So the Geological Survey staggered on under a woefully reduced appropriation, a handicap shared by every other governmental function that had no direct bearing on defense.

All the American countries, and for that matter, every nation save those in Western Europe, were enjoying a feverish, abnormal, hectic boom. The flight of capital from Europe, and the incessant, avid, frantic cry for food, had created a rush of business, and exports mounted unbelievably. In this emergency, France and the nations under her hegemony, those who had clung so stubbornly to gold ever since the second revaluation of the franc in 1938, were now at a marked advantage, since their money would buy more wheat, more cattle, and more coal. But the paper countries, especially Britain, shivered and froze in stone cottage and draughty manor alike.

On the eleventh of March, that memorable Tuesday when the thermometer touched twenty-eight below in London, Ted reached a decision toward which he had been struggling for six weeks. He was going to swallow his pride and see Kay again. Washington was buzzing with rumors that Sir Joshua was to be recalled, that diplomatic relations with England were to be broken as they had already been broken with France. The entire nation moved about its daily business in an air of tense expectancy, for the break with France meant little in view of that country's negligible sea power. but now, if the colossus of the British navy were to align itself with the French army- This was also the day on which the President replied with open friendliness to Japan's amicable message; the plains of Manchoukuo. so long a troublesome issue, became now a bond of common sympathy.

But what troubled Ted was a much more personal problem. If Sir Joshua Lovell were recalled to London, that meant that Kay would accompany him, and once she were caught in the frozen Hell of Europe, he had a panicky feeling that she was lost to him forever. When war broke, as it surely must, there would go his last hope of ever seeing her again, Europe, apparently, was doomed; for it seemed impossible that any successful invasion could be carried on over thousands of miles of ocean, but if he could save the one fragment of Europe that meant everything to him, if he could somehow save Kay Lovell, it was worth the sacrifice of pride or of anything else. So he called one final time on the telephone, received the same response from an unfriendly maid. and then left the almost idle office and drove directly to her home.

The same maid answered his ring.

"Miss Lovell is not in," she said coldly. "I told you that when you telephoned."

"T'll wait," returned Ted grimly, and thrust himself through the door. He seated himself stolidly in the hall, glared back at the maid, and waited. It was no more than five minutes before Kay herself appeared. coming

wearily down the steps.

"I wish you'd leave," she said. She
was pallid and troubled, and he felt a
great surge of sympathy.

"I won't leave."

"What do I have to do to make you go away? I don't want to see you, Ted."

"If you'll talk to me just half an hour, I'll go." She yielded listlessly, leading the way into the living room where a fire still crackled in cheerful irony. "Well" she asked.

"Kay, do vou love me?"

"I-No, I don't!"

"Kay," he persisted gently, "do you love me enough to marry me and stay here where you're safe?"

Tears glistened suddenly in her brown eyes. "I hate you," she said. "I hate all of you. You're a nation of murderers. You're like the East Indian Thugs, only they call murder religion and you call it batriotism."

"I won't even argue with you, Kay. I can't blame you for your viewpoint, and I can't blame you for not understanding mine. But—do you love

"All right," she said in sudden weariness. "I do."

"And will you marry me?"

"No. No, I won't marry you, Ted. I'm going back to England."

"Then will you marry me first? I'll let you go back, Kay, but afterwards—if there's any world left after what's coming—I could bring you back here. I'll have to fight for what

I believe in, and I won't ask you to stay with me during the time our nations are enemies, but afterwards, Kay —if you're my wife I could bring you here. Don't you see?"

"I see, but-no."

"Why, Kay? You said you loved

"I do," she said almost bitterly. "I wish I didn't, because I can't marry you hating your people the way I do. If you were on my side, Ted, I swear I'd marry you tomorrow, or today, or five minutes from now—but as it is, I can't. It just wouldn't be fair."

"You'd not want me to turn traitor," he responded gloomily. "One thing I'm sure of, Kay, is that you couldn't love a traitor." He paused. "Is it goodbye, then?"

"Yes." There were tears in her eyes again. "It isn't public yet, but father has been recalled. Tomorrow he presents his recall to the Secretary of State, and the day after we leave for England. This is goodbye."

"That does mean war!" he muttered. "I've been hoping that in spite of everything—God knows I'm sorry, Kay. I don't blame you for the way you feel. You couldn't feel differently and still be Kay Lovell, but—it's dammed hard. It's dammed hard!"

She agreed silently. After a moment she said, "Think of my part of it, Ted—going back to a home that's like—well, the Rockefeller Mountains in Antarctica. I tell you, I'd rather it had been England that sunk into the sea! That would have been easier, much easier than this. If it had sunk until the waves rolled over the very peak of Ben Macduhl—" She broke off.

"The waves are rolling over higher peaks than Ben Macduhl," he responded drearily. "They're—" Sud-

denly he paused, staring at Kay with his jaw dropping and a wild light in his eyes!

"The Sierra Madre!" he bellowed, in such a roaring voice that the girl shrank away. "The Mother range! The Sierra Madre! The Sierra Madre!"

"Wh-what?" she gasped.

"The Sierra—! Listen to me, Kay! Listen to me! Do you trust me? Will you do something—something for both of us? Us? I mean for the world! Will you?"

"I—I—"

"I know you will! Kay, keep your father from presenting his recall! Keep him here another ten days even another week. Can you?"

"How? How can I?"

"idon't know. Any way at all. Get sick. Get too sick to travel, and beg him not to present his papers until you can leave. Or—or tell him that the United States will make his country an alternate proposal in a few days. That's the truth. I swear that's true, Kay."

"But-but he won't believe me!"

"He's got to! I don't care how you do it, but keep him here! And have him report to the Foreign Office that new developments—vastly important developments—have come up. That's true, Kay."

"True? Then what are they?"

"There isn't time to explain. Will you do what I ask?"

"I-I'll try."

"You're—well you're marvelous!" he said huskily. He stared into her tragic brown eyes, kissed her lightly, and rushed away.

A SA GAUNT was scowling down at a map of the dead Salton Sea when Ted dashed unannounced into his office. The rangy Texan looked

up with a dry smile at the unceremonious entry.

"I've got it!" yelled Ted.

"A bad case of it," agreed Asa Gaunt, "What's the diagnosis?"

"No, I mean—Say, has the Survey taken soundings over the Isthmus?"

"The Dolphin's been there for weeks," said the older man. "You know you can't map forty thousand square miles of ocean bed during the linch hour."

"Where," shouted Ted, "are they

sounding?"

"Over Pearl Cay Point, Bluefields, Monkey Point, and San Juan del Norte, of course. Naturally they'll sound the places where there were cities first of all."

"Oh, naturally!" said Ted, suppressing his voice to a tense quiver. "And where is the Marlin?"

"Idle at Newport News. We can't operate both of them under this year's budget."

"To hell with the budget!" flared Ted. "Get the Marlin there too, and any other vessel that can carry an electric plumb!"

"Yes, sir—right away, sir," said Asa Gaunt dryly. "When did you relieve Golsborough as Secretary of the Interior, Mr. Welling?"

"I'm sorry," replied Ted. "I'm not giving orders, but I've thought of something. Something that may get all of us out of this mess we're in."

"Indeed? Sounds mildly interesting. Is it another of these international fiat-money schemes?"

"No!" blazed Ted. "It's the Sierra Madre! Don't you see?"

"In words of one syllable, no,"

"Then listen! I've flown over every square mile of the sunken territory. I've mapped it and photographed it, and I've laid out geodetics. I know that buried strip of land as well as

I know the humps and hollows in my own bed."

"Congratulations, but what of it?"
"This!" snapped Ted. He turned to
the wall, pulled down the topographical map of Central America, and began to speak. After a while Asa Gaunt
leaned forward in his chair and a
queer light gathered in his pale blue
eyes.

TATHAT follows has been recorded and interpreted in a hundred ways by numberless historians. The story of the voyages of the Dolphin and the Marlin, sounding in frantic haste the course of the submerged Cordilleras, is in itself romance of the first order. The secret story of diplemacy, the holding of Britain's neutrality so that the lesser sea-powers dared not declare war across three thousand miles of ocean, is another romance that will never be told openly. But the most fascinating story of all, the building of the Cordilleran Inter-continental Wall, has been told so often that it needs little comment.

The soundings traced the irregular course of the sunken Sierra Madre mountains. Ted's guess was justified: the peaks of the range were not inaccessibly far below the surface. A route was found where the Equatorial Counter Current swept over them with a depth at no point greater than forty fathoms, and the building of the Wall began on March the 31st. began in frantic haste, for the task utterly dwarfed the digging of the abandoned Canal itself. By the end of September some two hundred miles had been raised to sea-level, a mighty rampart seventy-five feet broad at its narrowest point, and with an extreme height of two hundred and forty feet and an average of ninety.

There was still almost half to be

completed when winter swept out of the north over a frightened Europe. but the half that had been built was the critical sector. On one side washed the Counter Current, on the other the Equatorial Drift, bound to join the Gulf Stream in its slow march toward Europe. And the mighty Stream, traced by a hundred oceanographic vessels, veered slowly northward again, and bathed first the shores of France, then of England, and finally of the high northern Scandinavian Peninsula. Winter came drifting in as mildly as of old, and a sigh of relief went up from every nation in the world.

Ostensibly the Cordilleran Intercontinental Wall was constructed by the United States. A good many of the more chauvinistic newspapers bewailed the appearance of Uncle Sam as a sucker again, paying for the five hundred million dollar project for the benefit of Europe. No one noticed that there was no Congressional appropriation for the purpose, nor has anyone since wondered why the British naval bases on Trinidad, Jamaica, and at Belize have harbored so large a portion of His Majesty's Atlantic Fleet. Nor, for that matter, has anyone inquired why the war debts, dead for a quarter of a century, were so suddenly exhumed and settled so cheerfully by the European powers.

A few historians and economists may suspect. The truth is that the Cordilleran Inter-continental Wall has given the United States a world hegemony, in fact almost a world empire. From the south tip of Texas, from Florida, from Porto Rico, and from the otherwise useless Canal Zone, a thousand American planes could bomb the Wall into ruin. No European nation dares risk that.

Moreover, no nation in the world,

not even in the Orient where the Gulf Stream has no climatic influence, dares threaten war on America. If Japan, for instance, should so much as speak a hostile word, the whole military might of Europe would turn against her. Europe simply cannot risk an attack on the Wall, and certainly the first effort of a nation at war with the United States would be to force a passage through the Wall

In effect the United States can command the armies of Europe with a few bombing planes, though not even the most ardent pacifists have yet suggested that experiment. But such are the results of the barrier officially known as the Cordilleran Inter-continental Wall, but called by every newspaper after its originator, the Welling Wall.

T was mid-summer before Ted had time enough to consider marriage and a honeymoon. He and Kay spent the latter on the Caribbean, cruising that treacherous sea in a sturdy fiftyfoot sloop lent for the occasion by Asa Gaunt and the Geological Survey. They spent a good share of the time watching the great dredges and construction vessels working desperately at the task of adding millions of cubic vards to the peaks of the submarine range that was once the Sierra Madre. And one day as they lay on the deck in swimming suits, bent on acquiring a tropical tan. Ted asked her a question.

"By the way," he began, "you've never told me how you managed to keep Sir Joshua in the States. That stalled off war just long enough for this thing to be worked out and presented. How'd you do it?" Kay dimpled. "Oh, first I tried to tell him I was sick. I got desperately sick."

"I knew he'd fall for that."

"But he didn't. He said a sea voyage
would help me."

"Then-what did you do?"

"Well, you see he has a sort of idosyncrasy toward quinine. Ever since his service in India, where he had to take it day after day, he develops what doctors call a quinine rash, and he hasn't taken any for years."

"Well?"

"Don't you see? His before-dinner cocktail had a little quinine in it, and so did his wine, and so did his tea, and the sugar and the sait. He kept complaining that everything he ate tasted bitter to him, and I convinced him that it was due to his indirection."

"And then?"

"Why, then I brought him one of his indigestion capsules, only it didn't have his medicine in it. It had a nice dose of quinine, and in two hours he was pink as a salmon, and so itchy he couldn't sit still!"

Ted began to laugh, "Don't tell me that kept him there!"

"Not that alone," said Kay demurely. "I made him call in a doctor, a friend of mine who-well, who kept asking me to marry him—and I sort of bribed him to tell father he had— I think it was erysipelas he called it. Something violently contagious, anyway."

"And so-?"

"And so we were quarantined for two weeks! And I kept feeding father quinine to keep up the bluff, and well, we were very strictly quarantined. He just couldn't present his recall!"

# In the Realm of Books

By C. A. BRANDT

A Kaleidoscopic Picture of the Far East

INDIAN MOSAIC. By Mark Chauning. Published by J. B. Lippincott & Co., Philadelphia, Pa. 316 pages. \$2.75.

Mr. Channing is well known to the readers of these pages through his three fine books: "The Poisoned Mountain," "White Python," and "King Cobra," which were all suggested by his experiences in India.

"Indian Mossic" is wastly different from all other books written about India. It is a very human book. It is the recorded reaction of an open, unbiased and inquiring mind towards a wonderful country. It is the story of a young English officer who honestly tries to understand india and its much varied people of the story of the story of the story of a young English officer who honestly tries and gains a greater and better understanding than his brother-officers do, who remain aloof and to whom the East Indians will always remain just hordes of "colored" people. Mr. Channing believes that India's problems are neither social nor political, but strictly religious.

To sum up, the book is just what the titles implies: an "Indian Mosaic."

# From Fiction to Facts

UNCOMMON KNOWLEDGE. By George W. Stipson. Published by the Bobbs-Merrill Company, Indianapolis, Indiana. 368 pages. \$2.00.

After a steady diet of Fantastic Adventures and Science Fiction a book like "Uncommon Knowledge" acts like a good cheese after a heavy meal—it helps you digest what you had, and from this point of view I strongly recommend it to all Science Fiction Fans who feel the need of a change in their literary diet.

Quite a number of New York dailies feature columns entitled "Strange as it seems" or "Believe it or not," may be crudely but sensationally illustrated, but "Uncommon Knowledge" is very much better.

The book contains a wealth of unusual information, which makes fascinating reading, and it reminded me strongly of eating cherries—once started—hard to stop.

Read it and enjoy it.

The Riddle of the Ages Solved At Last

THEY FOUND ATLANTIS. By Dennis Wheatley. Published by J. B. Lippincott Company, Philadelphia, 325 pages, \$2.00,

This book is dedicated to William Beebe, whose bathysphere exploits undoubtedly furnished the idea underlying this magnificent yarn. A German professor who has definite information about the location of Atlantis has constructed an immense bathysphere, large enough to accommodate about twenty people and the money to finance his exploration of Atlantis is furnished by an American multi-millionairess, who is advised to do so by her secretary. Unfortunately the professor has conspired with the secretary and an American super-gangster to deprive the hieress of her vast fortune. When the gangster sees his scheme go awry he causes the bathysphere which at this moment is filled with the entire party, to be wrecked on the floor of the ocean. Now begins the real story of how Atlantis was discovered. By means of mysterious ocean currents the huge sphere moves on until it finally comes to rest in an immense sub-sea lock. The waters recede, and the explorers have great trouble in getting out of the sphere, but finally manage to escape and are at once attacked by vast hordes of subhuman, blind creatures, which they afterwards find out are the surviving results of laboratory-created slaves. In the very nick of time the party is rescued by a small group of Atlanteans, the sole surviving remnant of a once mighty race. We learn a lot about the wonders of old Atlantis, and how the small group of Atlanteans managed to carry on for these many thousands of years. All this makes very fascinating reading. With the super-science inherited from their forbears, they created a veritable subterranean Paradise, in which they led a carefree god-like existence. By developing telepathy to an unheard of extent they formed contacts with the upper world, and they were able to send their astral bodies on long voyages, constantly adding to their knowledge, and becoming thoroughly familiar with the languages of the peoples who lived on the surface. Our party adapts itself very nicely to the Atlanteans' mode of existence. They have discarded their clothing and are beginning to enjoy life to the fullest extent.

Everything goes well until one of the explorers who is presented as a Valentino type or Movie Crooner murders the old professor. The Atlanteans arise in horror and banish the party from their presence. By means of an old map, engraved on gold, which they discovered in the library they finally find their way back to the upper world.

A first class fantastic adventure story, which I heartily recommend.

# A Splendid Fantasy

ODD JOHN. By Olaf Stapledon. Published by E. P. Dutton & Co., Inc. 300 4th Ave., New York, 282 pages, \$2.00.

Mr. Stapledon is not a prolific writer, but when he produces a book, it is something worth while, something to make you sit up

and take notice. "Odd John" is the story of a superhuman being as told from the records of a newspaperman who knew him from the days of his belated birth. His face remained babyish until he was about ten, and remained a boy's face until his death at twenty-three. His eves were green with enormous black pupils. in other words-a veritable freak, yet, while reading "Odd John," one gains the impression that you and I are the freaks and that Odd John is normal. He did not start walking until he was six, but at five he already had put mathematical wizards to shame and confusion. As he grows older he becomes convinced that he has been selected to perform some great task and realizes that he will need lots of money for this purpose. Our laws mean nothing to him, and the murder of a friendly policeman who catches him while he burglarizes a house seems to John an incident hardly worth thinking about. At twelve he studies finances, makes a few inventions, which his journalistic friend markets under John's direction. These inventions as well as his financial speculations flourish in the most extraordinary manner, and Odd John becomes very rich. He then begins to communicate telepathically with kindred spirits all over the world, and by-and-by he has collected a group of other super-humans from China-Thibet-Africa-Turkey, etc. In a ship of his own design, powered by an atomic motor of his own invention the superhumans travel to a South Pacific island where they start on their life-task of reshap-

ing the world by the creation of a new race Unfortunately several nations interfere and though John succeeds for a while in

of super-human beings.

confusing the armed forces sent against him, he finally realizes that "Contra Stultitiam Dei Frustra Pugnant," and he causes the island to sink and disappear.

That is in a rough outline the story as it appears without speculating and delving into the hidden meaning of "Odd John," I am willing to bet that Mr. Stapledon had a lot of fun laughing at humanity and its foibles

and weaknesses. An intensely interesting book, and the faint echoes of Wells and Hiltons' "The Far Horizon," which one fancies to hear occasionally, make it even more so.

"Odd John" is very captivating, to say the least.

# Again Tarzan the Indestructible

TARZAN'S QUEST, By Edgar Rice Burroughs. Published by Edgar Rice Burroughs Inc. Tarzana, Cal. 318 pages, \$2.00.

The Princess Sborov, a very rich, very fat and very very foolish old woman, a Princess by virtue of having married Prince Shorov. one of those things from the verminous Balkan States, which always have been in-fested with Princes like fleas on a tramp dog, is on a quest for eternal youth, which she hopes to find in the jungles of Africa. She has heard legendary rumors about a tribe of wizards, who have discovered the secret of prolonging youth forever. So she buys an aeroplane, hires one Neal Brown, an American, as pilot, and accompanied by her Prince Sborov, Lady Jane Porter Clayton (Mrs. Tarzan), who is in a hurry to join her mate, and the princely couple's valet and maid, they set out for their destination, but a severe tropical storm causes her plane to crash in the jungle. Miraculously they escape unhurt, but trouble starts right away. The Prince murders the Princess-the maid disappears into thin air-but the remainder of the party under leadership of Lady Jane set out on foot to reach an outpost of civilization.

In the meantime, Tarzan has been roaming the jungles trying to find a mysterious tribe

of white savages, who kidnap young girls from tribes near and far. This is the beginning of Tarzan's Quest.

But let me say this: Tarzan's Quest, in my opinion is one of the best if not the best of the entire Tarzan Series. It is packed with thrills from cover to cover, and furthermore it is written somewhat humorously, which

makes the book twice as enjoyable, Don't miss it.

# DISCUSSIONS

in this department we shall discuss every month topics of interest to readers. The editors invite correspondence on all subjects directly or indirectly related to the atorics appearing in this magazine.

# A Scot Sends Us Encouragements In Our Work, We Thank Him Accordingly.

Editor, AMAZING STORIES:

I have been a reader of science fiction for about six years now, and I'm still as sane as ever I was. During this period I have noticed from time to time, arguments concerning the possibility of time travel cropping up in the Discussion pages. As a rule, there is usually some bloodthirsty person talking about murdering his great grandmether, just to prove that time travel is impessible! Well! I have heard of people who had a grouch against their mother-in-law, but why pick on a great grannie? Of course time travel is impossible, otherwise we should already know of it, it would have been an accomplished fact from the beginning of time. However, just because a story of this type does appear there is no need for the "unbelievers" to get aerated and condemn the author: these people should realize that "the story is the thing" and then they would probably enjoy the whole mag. much more. The magazine itself too, I notice, comes in for much criticism, even the artists are not immune, in fact I have been waiting for somebody to start in lashing at the advertisers for something or other. I think the mag. is swell and personally I don't care a bit what it looks like, so long as you can still call it a magazine, and I can still read it. Lastly, I think serials are "the bunk," but this is only my opinion, I suppose they suit a good many readers. So now I will end my first letter to any science fiction magazine. Wishing you and all your readers all the best.

MICHAEL CRAY, 14 Lumsden, St., Glasgow, C. 3. of the three Science Fiction Magazines. So

(2) Inside illustrations . . . . Lousy. Morey is not so good at his best and now he is far from his best. Where is the new Artist you were going to get and who is he? Last place on inside illustration.

(3) Editorial . . . . Good, I always find it full of information. It is the only Science Editorial out today. First place on that.

(4) Stories . . . Most of your stories, lately, are good, but some had ones do drop in, like the "Hoffman's Widow." I place the stories in the last two issues as follows:

# DECEMBER

- (1) Uncertainty (2) The Space Marines
- (3) Death Creeps on the Moon (4) Devolution (5) The Time Control

# (6) When the Earth Stood Still

- (1) The Last Neanderthal Man (2) "By Jove"
- (3) The Planet of Perpetual Night (4) Prometheus
  - (4) Prometheus (5) Denitro

February takes Second Place on Stories. I would like to buy back issues of AMAZ-ING and WONDER. Any reader having them please get in touch with me. I have been reading your magazine a

year and this is my first letter to you. The only trouble with your magazine is your inside illustrations.

Honing for a monthly and quarterly.

Hoping for a monthly and quarterly, I remain,

JAMES V. TAURASI, 137-07 32 Avenue, Flushing, New York.

(This is one of those letters which require no comments. Your inquiry about back numbers is in the hands of our Subscription Department. If you wish it, we can send you the names of some dealers in second hand and back numbers of magazines. Your letter may produce results.—Editors.)

A Review of December and February Issues Editor, Amazing Stories:

Here is my say to the last two issues of AMAZING STORIES.

(1) Cover . . . . Both the Dec. and Feb. covers are good, they are in fact the best

One of the "Real, Old Guard" Writes a Friendly Letter, and Tells About "Wild Bill" Editor, AMAZING STORIES:

This letter is from one of the real old guard who still reads science-fiction. It is over ten years since I first started to read a science fiction magazine, and I can truthfully say that I've read them all since then, including all quarterlies.

After hitting bottom, it seems to me that AMAZING STORIES is gradually improving. The December 1936 cover reminds me of some of the old ones, and when I glanced at it, I at first thought that someone had gotten out one of my old copies and put it on my desk. It took a second look to convince me.

"Uncertainty" by Campbell ended just as would be expected of Campbell, I for one, can't see when a weapon is needed, why the hero just goes out and makes one. This I think is one of Campbell's shortcomings.

It's certainly a long cry from the "Four-Dimensional Roller Press," (Olsen's first in AMAZING) to "The Space Marines and the Slavers," but the breezy style was most enjoyable, "Death Creeps the Moon" is an old theme, but the ending wasn't the usual pleasant one, I see that Hamilton and his protoplasm are back again.

"The Time Control" and "When the Earth Stood Still" are hardly worthy of mention inasmuch as they have been writing these kind of stories since stf. began.

I enjoyed the editorial on Astrology, and the editor has voiced my sentiments exactly. I really think that the editorials are the mainstay of AMAZING STORIES.

Now I come to the main idea of this letter. I'm going to clear up the mystery of Wild Bill Hoskins since he doesn't clear it up himself. Some time in 1934 I advertised that I had several copies of The Skylark and Skylark III for sale. Among the inquiries were one from W. B. Hoskins, I wrote to him, and asked him what the W. B. stood for, and I mentioned that it might be Wild Bill. I mentioned this because Hoskins is very similar to Hickock, and to the average youngster of today, Wild Bill Hickock is now unknown. But a generation ago, there was hardly anyone who hadn't heard of him. Mr. Hoskins answered that W. B. stood for Wild Bill, or Willam Barnes, or Why Bother. In my further communications to Bill, I always addressed my letters to Wild Bill, and I guess he sort of adopted it. I hope this will clear up the mystery of Wild Bill.

In closing this letter, I'm not going to ask for straight edges, no indeed, all I want is resumption of monthly publication, return of the large size, publication of the quarterly, and-but why go on? All we can do is live in hope, and die in despair!

HARRY BOOSEL 1215 Shepherd St. N.W., Washington, D. C.

(The Editor wishes to thank you for your interesting letter. One of our correspondents writes that he believes in water-divining. It is a curious example of the survival of the unfittest. It is not impossible that some of the practitioners believe in it. In a newsstand near our office two astrological magazines are exposed for sale. It is strange that so many people believe in it.-EDITOR.)

### A Disbeliever In Astrology Believes In the Divining Rod

Editor, AMAZING STORIES:

I hope your December Number starts quite a little discussion. With what you say about astrology I am in entire agreement. However, when you speak of water-divining as a superstition, you are clearly talking of something of which you are ignorant. Water-divining is no fake, but a power given to not one in a hundred thousand. Perhaps you do not know that in this country water-diviners are frequently employed by local authorities, such as County and District Councils, and even by the Government. However foolish we may consider the action of these Boards, it is unlikely that they will pay good money for divinations which fail to come true. I am particularly interested in this matter, because a waterdiviner lives in the vicinity of my home, and he can divine the spot where a well should be dug, and he can follow the course of an underground stream or a pipe line. In many of these cases it would be absolutely impossible for him to guess or to have previous knowledge of these places. You say it has been investigated by supposedly intelligent people, but the puzzle remains. Why did the investigators not try to use the rod themselves? The answer is that they did and failed. Water-diviners claim that the action of finding water exhausts them. This seems to parallel the exhaustion experienced by spiritualist mediums. It seems therefore that the action draws some sort of energy from them. In this country considerable time and money has been spent by such bodies as the Institute for Psychical Research, and by men such as Mr. Harry Price, in the investigation of the supernatural. All pains have been taken in closing all loopholes for fraud; such devices as infra-red photography in the investigation of séances are frequently employed. These investigations have exposed a number of clever fakes, but at the same time there have been found many cases which cannot be explained by any known scientific means. Among such cases is water-divining. To call water-divining a superstition is therefore to deny scientific expert evidence, and also plain facts.

C. R. FOSTER, Close House, Bardon Mill, Northumberland, England.

(The motions of the divining rod, as it is called, can be produced by anyone to whom the utterly simple method has been explained. There is no scientific evidence to prove its authenticity. A practitioner may deceive himself as well as those who pay him. That is a manifestation of week, human nature. It is more likely that he is fraudulent in his practices—Exprox.

#### A Letter of Appreciation After a First Reading of Amazine Stories

Editor, AMAZING STORIES:

After reading my first copy of AMAZING STORIES I think your magazine is the best, in fact the best I have ever seen. The first story of AMAZING I ever read was "Universe Wreckers" by Edmond Hamilton, published May, 1930. It was the best interplanetary story I ever read and "We of the Sun" was another good one and "The Gimblet" by Victor Endersby was fair. "When the Atoms Failed" by John W. Campbell, Jr. was very good. But getting back to interplanetary travel, it is looked upon as a crazy man's raving just as television was a few years ago, but when it does come it is going to take men who are not afraid to risk their lives. But I do not think a rocket can travel in a vacuum. When a balloon is blown up and then released it will go at great speed until the air has all blown out. If it was in a vacuum it would not go at all but would tend to burst. What might not be found in other worlds, alien worlds, would be truly alien.

FRANK L. VOGEL, R. 4 St. Marys, West Virginia.

(The rising of a balloon in the air is a species of flotation. The rocket acts by reaction and would go faster in a vacuum and would rise further than in air. The utmost efforts of man have only brought him a very few miles above the surface of the earth, a little more than one thousandth of its diameter. And the moon is nearly thirty times the diameter of the earth distant. So we have only risen about one thirty thousandth of the distance of the moon from us.—EDITOR.)

# A Pleasant Letter from Australia

Editor, AMAZING STORIES:

Although I have only been a regular subscriber to your magazine for twelve months, I have always been very keen about S.T.F., and have read various copies of A.S. for several years.

My favorite type of story is that concerning space travel and adventure. Therefore you can appreciate that those thrilling and truly amazing stories by Dr. Smith and J. W. Campbell, Jr., meet an eager reception from me. I read the conclusion of "Triplanetary" and only wished I could have read the first three installments. It seemed to me a story far above the ordinary. I later obtained the first part of "The Contest of the Planets," but have not yet found the finish. I should like to get into touch with anyone who could satisfy me, also to correspond with me. I am 19 years old and am interested in everything, but particularly science, sport and aviation.

Any other Australian readers who complain of their inability to get regular supplies will have no difficulty if they get in touch with the Australian agents, Messrs. Gordon and Gotch, as I have done.

I think Morey's covers are excellent, but his illustrations are not so good, as he very rarely uses a scientific occurrence in the story. The only other complaint I have to make about his work is that he never makes the faces of his subjects pain enough, but leaves them blurred. I hope the magazine soon returns to a monthly publication, as, one returns to a monthly publication, as, "Uncertainty," two months is too long to have to wait, the suspense is terrible.

In closing I wish you luck, and may you publish many more stories like "The World Aflame."

Val K. Leslie, Gordon, Victoria, Australia.

(We always get the nicest letters from Australia. AMAZING STORIES has a number of agents in different countries and your publication of the regularity of our Australian agents is certainly a compliment to them. You will undoubtedly find a correspondent—EDITOR.) An Interesting Criticism of Our Magazine, Interesting Partly Because Good Natured.

Editor, AMAZING STORIES:

Have not read AMAZING STORIES for a long time, but I am slowly recovering the ground I lest the few years I completely ignored science-fiction. Through friends and the various second-hand book shops in the locality I am acquiring many of the excellent numbers put out recently. I'm not he abstenious fellow I thought I was.

The serial by John W. Campbell, Jr., was marvelous. I think it every bit as good as "Beyond the End of Space" which I regard as one of Campbell's major works. Many have said that his powerful narrative style compares favorably with that of Dr. E. E. Smith's. In the words of Dr. Stevens, character in "Spacchounds of IPC," Campbell, Jr. is "All X."

I have but one complaint to make, and it concerns a rather miner point, but it was quite annoying. In "Devolution" Edmond Hamilton mentions "... cities built of crystallized mental energy." This is very picturesque, no doubt, but in a story purporting to be scientifiction it seems definitely mad a propos. Better suited for welf fiction, I think. Of course, the newer physics with their theorizing of the interhospiess with their theorizing of the interhospiess and if may be a suite of a scientific credibility. Despite my statements I thought the story interesting.

Bob Oben's story "The Space Marines and the Slaver" was very good, recalling, as it did, the asspicious occasion of Captain Brink's first appearance in AMAZING. This was, if memory doesn't fail me, late in 1932. I'm glad to see that the old characters still make their appearance. Neil R. Jones had a wonderful series of stories anent a certain Professor Jameson. I hope that the Prof is still alive, as I would like to renew and def friendship. Yes, I have just looked through Discussions and Mr. Mariella's letter mentions a yarn called "Labyrinth." I'm sorry I missed that one, but I'll get the next.

"The Time Control" by Philip Bartel actually astounded me. It is not so long ago, that all stories dealing with the Soviets were fanatical distribes against the Russians and all social experimenters. It speaks well that they have adopted the liberal attitude toward the U.S.S.R. One of the necessary attributes of an STF reader, and also of the writers, is an open mind. Of course, the anti-reds will mark me down as a "bolshevit" but I'll still commend all signs of fair-mindedness I detect in the science-faction authors.

What has become of A. Hyatt Verrill with

his always fascinating stories of South and Central America. Once they were almost a regular feature of AMAZING. Nor have I seen any signs of Captain S. P. Meek lately. Three of his stories, "Submicroscopic," "Awlo of Ulm," and "Drums of Tapajos" were really STF classics. May we have these authors again.

I am glad to see that the magazine has retained that comet-tall title. This gives A. S. a distinctive appearance matched by few magazines on the newstands. As to format I will say that I am disappointed with the smaller size. AMAZING, of the early large size, has a place in my heart that the new will find difficult to usurp. But, why complain in my first letter in several years? Perhaps Dr. Sloane won't like me.

Morey is excellent, but why are there no illustrations by Wesso? Remember the illustrations he did for "Spacehounds of IPC?" They were among the best done by any scientification artist. Paul, too, as far as I can see, is not painting at present Why not have the man who first drew for AMAZ-ING back again?

May I use the Discussions columns to contact Mr. Forrest J. Ackerman? As I remember Mr. Ackerman was an authority on scientifilms, and I would like some information concerning the new films. If Mr. Ackerman will write me at the address below I will return the cost. Or if there are any STF fan periodicals being published I would be delighted to hear from them. Thank you.

I mustn't make this letter too long, so I'll close with intentions of writing again, and often. With the best of luck to AMAZING STORIES. I remain.

FRED C. MILES, New Providence, New Jersey.

P.S. I almost forgot. Have AMAZING STORIES published monthly soon.

(We have definitely enjoyed your letter, well thought out and not scolding us for fallings which we are perfectly aware of in our inner consciousness. Write as long letters and as often as you wish.—EDITOR.)

A Letter from Australia, Recalling Old Time Experiences of the Editor of Amazing Stories.

Editor, AMAZING STORIES:

This letter is really fan mail for you and your eminent associate editors, writers and artists. My scientific education by your publications goes back to 1922 when I first started filing Practical Electrics and Science and Invention. Then in February 1926 came the, to me, sad aews that in the future I was to be deprived of one of my monthly pleasures.

Soon after this I heard rumors of Amaz-ING STORES and managed to get a news agent (W. Martin) to accept my subscription which was something like 22 for the year, since when I haven't missed an issue. As I send my magazines to hospitals I have no files which I often regret, as my files of "E.", "S.6.I' and The Experimenter eaable me to wist my old pais, sicilating Dr. Hackmans, The Vibrator of Death, Favous host of others who paved the way for our present highly developed sciences fiction.

As my present age is 28 I started early, and it is my sincere hope that there will be scientific magazines for my enjoyment all the rest of my life.

I sometimes read a story that annoys me because of inaccuracies, but seldom is it in A. S. And if there's a story I don't like, I only have to wait and read the readers' letters to realize how much "one man's meat is another man's poison."

I would be glad to have correspondents among your readers who are employed in the electrical or cinema trades to exchange ideas an electrical work methods in different places. Of course all letters will be answered.

But it seems to be fashionable to cramevery letter with criticism so I will ask why W. Skidmere has dared to write "The End" to "Posi & Nega"? Does he think he can outrage all laws of nature by destroying my little friends?

I'll admit he has made a little amendment by giving us "The Maelstrom of Atlantis," but even that is not enough, I want them back.

It has taken me many years to get to the point of writing this letter, but I hope to have the pleasure of writing again soon.

> S. J. CZYNSKI, 226 Little Collins St., Melbourne, C.1, Victoria, Australia.

(We always get most friendly letters from Australia. You are not the only admirer of the "Posi & Nega" stories. They are very timely new when so much is laid upon the shoulders of the electrons. Do not keep us waiting "many years" for your next letter.—Eproca.)

#### A Letter About the Quality of Stories from a Young Reader

Editor, AMAZING STORIES:

Although generally, I believe your stories don't come up to the standard of some magazines, I think your Interplanetary tales have them licked to a franzle. I'm glad your Discussions Department keeps out such sweet nothings as Adolf (Ping Pong) Tucker's letters, which only serve to keep out the sensible epittles. As for Joe Buchanar's letter, in the same issue as Mayers', a scientifications of evidently, at least, two years' duration should know better than to ejaculate such expressions as "Rifictious"!

Do you know, Ed., it's almost an impossibility to interest people around my quarter in science-fiction. I lent your mag, to one of my friends who after reading it a while said, "This ain't 'arf good," thinking that at last I had found a future fan I enquired what was tickling him, and his reply was, "Why, some chap named Keller is getting the bird, good and proper!" My hopes dashed, I railied around, and discovered someone who was interested, but who finally moved away and left me alone, but unlike the film star of the long, sweeping eyelashes, I didn't want to be alone. By the way, Gordon McGloshen isn't the only one considered "cracked." I'm often being told that I'm one of those people outside the asylum. who sught to be inside. Seeing that this letter is fast approaching

infinity, I will close with my age which is 15 years, and bid you au revoir. E. CHARLES HOPKINS.

2C Stirling Road, Plaistow, Eng.

(We can emphasize what you write about omitting letters from Discussions. We receive so many really good letters that we wish we could give more space to them.— Earror.)

# Back Numbers For Sale

Editor, AMAZING STORIES:

Continued reading of your Discussions column gives me to understand that many of your readers are interested in securing back numbers. I have several which someone might like to have namely, October 1935 to Nevember 1936 inclusive volume 8 numbers of the property of the

FREDERICK O. LANCKEN, Riverside, Conn. An Opinion of Last Year's Amazing Stories

Editor, Amazing Stories:

Editor, AMAZING STORIES:
This is my opinion of AMAZING STORIES, based on the 1936 numbers.

The covers are fairly good. It is true that most of them fail to depict scenes from the stories, but that is not very important. The same applies for the black and white illustrations on the inside.

The Science Questionnaire, In the Realm of Books, the poems, and the articles all go a good way towards making AMAZING STORIES my favorite magazine. The only trouble with the articles is that they do not appear often enough.

Next we come to the Editorials and Discussions. The Editorials are good. I would even say that at the present, they are the best part of the magazine. As for Discrasions, here we have another very important part of AMAZING STOMES. The comments on the stories are for the most part, interesting and intelligent. The only fault that I have to find here is that the demands voiced by the readers in their letters to this department, go unheeded. For instance, there has been, during the past three years, a never the larger size. But in spite of these the publishers have taken no action.

Well, so far everything has been good. But after all, why do most of us buy AMAZ-ING STORIES? For the stories of course. And how were the stories during 1986. In my opinion they were terrible. With one or two exceptions, there was not a story that was worth reading. I certainly hope that there will be a change for the better in 1987.

And the same thing goes for one of your authors, Mr. Campbell. His last story, "Uncertainty" was the poorest that he has ever done. Even in "Conquest of the Plantes," he was not up to his usual high form. Among his earlier stories that I have read and enjoyed were: "When the Dark Star Passes," "Sloarte," "Jlandes of Space," "Invaders from the Infinite," "Pirsey Preferred," and the other "Acrot and Morey" stories. Why

the other "Acrot and Morey" stories. Why can't he write stories like these now. Well, I will close now by saying that I hope it won't be long before AMAZING STORIES becomes a monthly magazine again.

> Yours truly, J. WILSON, 85-22 125 Street, Jamaica, L. I.

(The comfort in your letter lies in the fact that you like us after all. As far as reprints are concerned the readers of a bimonthly publication seem to be entitled to new stories. There are definitely two opinions about the large or small size our our magazine. We are sorry you do not like Mr. Campbell's last story. It is quite uncertain when we will be a monthly once more.—EDITOR.)

A Letter from Edinburgh, a City of the Nicest Kind.

Editor, AMAZING STORIES:

I must congratulate you on the fine June issue. In my opinion, "Luvium Under the Sand" was easily the best story. There was little enough science, but for red-blooded adventure and good characterisation, it is hard to beat Were you not reminded of the style of Edgar Rice Burrougha? For Wright, substitute John Carter, for Luvium subsubstitute John Carter, for Luvium subtials, quite up to the best in the Mara series, with its duels and hair-breadth escapes.

I will not comment on the serial until I have read both parts, but I admire Lenkini's style. Incidentally, why "Lemke" on the cover? Also why "trigenimalf for "trigen-inal" in your Questionnaire? There are more typographical errors in A. S. than in other magazines on the market; I have noted transposed lines, and misprints by the dosen in recent issues. A small matter, but it lowers the general appearance of the mag-towers are the second of the second o

To resume our knitting, however. For the other stories, second place goes to Bob Olsen's amusing yarn, "Juvenescence Island." Not strikingly original or thought-provoking, its ingenious presentation saved it from being termed "hack" and gave the writer a few chuckles.

When Gaynor defied the Doctor with his blackjack, for instance, I chortled delightedly.

"Sword of Akalah" was a little gem. Again nice presentation helped. A clever writer can rehash "hack" plots so that their great age is concealed. This might be said of this atom-powered Atlantis yarn.

Incidentally, for the above-mentioned short, Morey did his best piece of work in a long time. Winter, who for a time, was supposed to be supreme at figure-work, could have done no better.

No appreciation of the magazine would be complete without a reference to the Editorial, which, as usual, I thoroughly enjoyed. Now that one of the three mags is off the newsstands, you are sole upholder of the Science Editorial against Mr. \* \* \*

peppy efforts.

Now just three questions, which I shall want answered Is it at all likely that the monthly publication will be resumed in the more future? For six issues a year is just not good enough. Why is it not possible to obtain other artists besides Mcroy? This other magazine, for its April issues had Wesse Brown, Marchioni, Sasty, Thompson and Hopper doing good work. May I whisper the eternal query (not of the three) Why not at least Wessel Now, the third. Don't fidget yet, I'm nearly through. In mites" appear, and for what date? This is just plain curiosity.

Best wishes for future success, from OSMOND ROBB.

107 Montgomery St., Edinburgh, Scotland.

(Thanks for your critical appreciation. The editor takes the greatest interest in preparing the Editorials which are now [at least we hope] a feature of AMAZING STORIES. We are fighting the printer, on his mistakes. The story you refer to we did not publish.—EDITOR.)

#### A Half and Half Way Letter, Some Scolding In It, But Not Very Vigorous.

Editor, AMAZING STORIES:

I often wonder when you are ever going to get a definite date of appearance. A few issues ago, you surprised everyone by coming about a week ahead of time; expecting the next issues to come out at the same time, you can imagine my disappointment at having to wait until about two weeks after the control of the control of

First I'll take up the matter of illustrations; give Morey 246, 597, 756, 600,243,000, 125,266,000.5 cheers, whoops, and whathave-yous for me. The cover for the December issue is about—as a matter of fact—is definitely, the best he had done since A. S. turned small-sized. I anxiously wait to see next issue's cover, hoping to see Morey duplicate the feat. The worst Morey illustration I have ever seen is his drawing for Bob Olsen's yarn, "The Space Marines and the Slavers." It looks like a mess of lines and scribblings; I wonder how Morey ever had the nerve to submit that to A. S. Which reminds me—where is that new illustrator you mentioned?

"The Time Control"-a good story. Can

you imagine a member of the U.S.S.R. being a hero? Usually, they are depicted as scowling villains.

"The Space Marines and the Slavers,"-I have long awaited another story about the

Space Marines.

"Devolution"—Eddie (world-saver) Hamilton is straying off his usual trek; however, it seems to be better than his usual hackneyed junk. Here's hoping that if we have more stories by Hamilton, they be more like this type than in his customary style.

"Death Creeps the Moon"—Gosh! A story in which the hero and heroine get killed. I could hardly believe my eyes when I read

this interesting tale.

"When the Earth Stood Still"—the usual happy ending "kinda" spoiled it; however, it was a fairly decent story.

I still would like to know when AMAZING is going to become monthly again, and when you are going to reissue the Quarterly.

John V. Baltadonis, 1700 Frankford Ave., Philadelphia, Penna.

(The sad ending of a story affects one the more because custom seems to rule to the effect that endings should be happy. —EDITOR.)

### A Letter of Birthday Congratulations for Which We Thank the Writer

Editor, AMAZING STORIES:

A happy birthday, Dr. Sloanel—and many more of them for you and AMAZING STORIBS. From having read your magazine for several years, I have gained the wish for its prolongation—and a satisfaction with your editorship. Though I have at times been disappointed with some of the stories you have selected I feel that perhaps few

others would have done better.

While we have in mind the subject of birthdays, and the passing of time which brings them into existence, let us engage in a little retrospection into the near past. I have just finished scanning the issues of your magazine which I have read in the past few years. Starting with the year 1934 (for to pass beyond that would carry one into the post-utopian era of Sigmund's paintings and 9 x 12 magazines) I have glanced at the stories, Editorials, and a few letters in the several issues since that time. By reading a passage here and there, my recollections have been freshened. I have conjured to mind some of the impressions aroused by my first readings of those stories. I have questioned myself thoroughly as to whether I honestly denounce or proclaim certain authors to myself; I have dwelt upon the impressions these stories might have made were they appearing currently. I've compared the stories of two years ago with those of today.

From this I have gained several hours' enjoyable pastime, and numerous conclusions, one of which may prove a reasonable comparison to similar ones on the part of

others of your readers.

Although I believe that one can point to a very definite evolution in the general aspects of science-fiction appearing in the popular magazines in the ten years since AMAZING STORIES was first published-an evolution, the extent of which few will deny -I believe that in AMAZING STORIES, at least, this evolution has been retarded noticeably. To my eye, the stories you publish today would have seemed quite matterof-fact three years ago, and vice versa, whereas in a similar period of years earlier in the history of science fiction this would not hold true. Of what is this an indication? Can it mean that science fiction as a type of literature has reached a point in its evolution beyond which it will not progress measurably for some time? I believe that to be an absurdity. Does it mean, then, that those writing for AMAZING STORIES are marking time, forestalling an exodus into radically different fields of expression before the time is at hand for such a change to be maturely executed? I hope that this is so. A contemporary of yours has advocated precipitous departures in thought from the average level of today's science fiction. As a result of this doctrine, many blunders have come forth, and much, very much, wasted effort. I think you will agree with me in saving that such changes should be the outgrowth of a gradual and sound evolution, not a blind, unprepared jabbing into the incomprehensible. I am entirely in favor of new methods of thought, and were they not consistently emerging, something would be wrong. But I believe that the attempt of an author to speak of such new thought as obsolete, and to bring forth immoderate ideas of his own, with no basis for those ideas, is presumptuous and condemnable. I will not name the several writers to whom I refer, for they have seemed unreasonably popular among readers of science fiction, and I do not wish to seem an iconoclast

I am taking the liberty of entering another plea for correspondents. One you did me the kindness of printing about a year ago brought me in contact with a few verinteresting young people. Now, I am asking for young men or women of a misanthropic turn of mind who would care to join me in a general and particular denunciation of humanity and its ways. Please write, any who may be of such a temperament, and let us match our hymns of hate! My age, though that is not important, is seventeen years.

I trust that my use of much time and space has not proven too tiresome to you, and thank you for any courtesy I may expect. Again, too, may I extend congratulations, and a wish for many returns of your birthday.

(Mr.) CLAIRE P. BECK, "Stonybrooke," Lakeport, California.

(Your interesting letter ends with a request with which we utterly disagree. Do you know what the etymology of misanthrope is? If not look it up in a "time abridged" and ask yourself if you are not starting a gloomy field of thought. Three or four years from now you will have a different end of the property of the pr

A Critical Letter from a Reader of Years' Standing

Editor, AMAZING STORIES:

Yes, "poor Mr. Pizzano" has been getting a great scolding, but he still sticks to what he said in the December, '35 issue!

I realize that you can't please everybody and that one man's meat may be another man's poison, yet just the same I believe that time-travel and satirical yarns do not belong in a science-fiction publication. John Chapman of Minneapelis states that many readers like that kind of stories and think the editor should print more of them. Well. Mr. Chapman, lots of people like wild west and detective tales-do you want the Editor to start printing those too? The time-travel and satirical tales are just about as valuable as these good hero, bad villain yarns, you know. Some people do not want stories containing logic and reason-they want fairy tales! They are the sort that can't grow up mentally! AMAZING should either publish real science-fiction or degenerate completely into a foolish, fantasy pulp. If the editor believes the magazine will sell more if it's full of impossible and mocking yarns-well, that's up to him.

Here are some stories that, in my opinion, are shining examples of what science-fiction should be:

"A Martian Odyssey," "Valley of Dreams," "Parasite Planet," "Dawn to

Dusk," "The Robot Aliens," "The Voyage of the Asteroid," "The Wreck of the Asteroid," "The Man From Beyond."

These are tales worth reading! They are logical, instructive, realistic, interesting, and stimulating to the imagination. Those are the kind that should appear in AMAZING.

CHARLES PIZZANO, 11 Winthrop St., Dedham, Mass.

(The Editor wishes to thank you for your letter of good criticism. AMAZING STORIES is to continue on its beaten track, settled by ten years of travel. The Editor is in accord with your views .- EDITOR.)

# A Commendatory Letter Starts Off As If To Scold. The Text Is Well Worth Reading. Editor, AMAZING STORIES:

I hope it isn't too presumptuous of an enthusiastic though hitherto silent scientifan to drop you a line giving an idea of the impression created by the December issue of AMAZING STORIES. In any case I shall now proceed to give a description of my reactions on reading this most illustrious copy of "our mag":

Your most humble servant sees a copy of AMAZING on the newsstand "around the corner". A vague fear possesses him as he catches a transient glimpse of the cover while purchasing it. On reaching his home he examines this cover more closely and the fear grows into actual horror when he sees the "cops and robbers" title of the cover story. Upon his eager devouring of the literature contained in this master epic of the times, however, his perfunctory dread fled and he immediately decided to write a commendatory epistle to the editor and incidentally ask the editor to run his favorite newspaper action strip, Dick Tracy, Hence, this letter.

And here are the opinions of any person except ego.

- 1. Cover-And Six Gun Jim reached for his shootin' irons.
- 2. Space Marines and the Slavers-Speaks for itself.
- Uncertainty—Hurry. Swell story.
- 4. The Time Control-Slightly (?) screwy. 5. Devolution-Outstanding story in the
- issue. 6. Death Creeps the Moon-Okeh.
- 7. When the Earth Stood Still-Old plot,
- well written. 8. Questionnaire-Good as usual.
- 9. In the Realm of Books-Very interesting department.

10. Discussions-Best department in the issue. Congrats are due to Robert A. Madle, J. V. Baltadonis, Robert Lowndes. John Chapman and the Iowa farmer for their good letters.

And now in conclusion (At which you heave a sigh of relief. A premature sigh to be sure, but still a sigh of relief.) I have three requests. This procedure is of course inevitable considering that it is the custom and tradition of fans to do so. First-If by any chance this missive should come to the eyes of the readers of AMAZING STORIES through the medium of the readers' department. I would like to announce to them that in the near future a fan magazine appelated Fantasia will appear. It will be edited by yours truly and will contain material originating through the apt use of the "flaming, fiery pens" (Did I get that quotation right?) of many prominent fans. Secondly-I would like an English correspondent. And last but not least, continue printing imaginative fiction of which "Devolution" and "Uncertainty" are very good examples. The Editorial was also very good. GEORGE R. HAHN,

100 Rogers Avenue, Brooklyn, N. Y.

(If we always received letters like this one the Editor's life would be less wearing than when scolding letters come in and have to be answered and the answering is not to be done in any form of weak excuse. An Editor has to take his scoldings. Your letter is very interesting .- EDITOR.)

### AMAZING STORIES Almost the Only Real Science Fiction Magazine

#### Editor, AMAZING STORIES:

AMAZING STORIES is now almost the only real science fiction magazine. You publish the best stories of all. You answer the letters in Discussions, you give us an Editorial, and that's more than others do. However, I must say that the December issue was not so good. Morey is a fine artist (the August and October covers were swell.) Please (please) go monthly again. Sonneman, Hasse, Skidmore, Endersby, Kieth, Kalland, Bernal, Breuerand and Vance are your best authors. Please get Doctor Keller.

#### ROSS M. GOUDEAU. 223 Elizabeth Ave., Lafayette, Louisiana.

(Thanks for your appreciative letter. The matter of resuming the monthly issues is in abeyance, and we may return to it soon, but it is quite uncertain. As the saying has "It all depends." Dr. Keller is coming .--EDITOR.)

An Appreciation From An English Reader Thanks Editor!

It is only recently that I have discovered your really fine mag, I've often seen it on the book stalls but it was only yesterday I bought one. What a surprise! Within a few hours I had read it from cover to cover and then rushed straight out, went to every book stall and store in the district and came home with about 20 back numbers. It's really surprising what pleasure one gets from reading stories of the type you and your staff produce. They seem to take one away from oneself, at least that is the effect they have on me. I forget all troubles and worries and sink right into a story. It's not a habit of mine to flatter or to wax into flowery praise but I think that without any doubt your mag, beats all to a frazzel.

I am rather eager to start a correspondence with someone in America, I'm 19 years old interested in most things.

ALFRED J. BALCOMBE, 110 Capel Road, Forest Gate, London, England.

(Your letter is highly appreciated, We really believe that compliantes such as yours are nicer than brickbais. You will find in one of the letters a request for a correspondent in chemistry. If you run through the Discussions in the magazines you have you will undoubtedly find other correspondents seeking "writing pals" as they are sometimes called. We shall hope to hear from you again—EDDTOR.)

## An Admirer of Morey's Work Who Has Read the Magazine For Four Years

Editor, AMAZING STORIES:

I've had the pleasure for four years last March, of reading your interesting and thought provoking magazine. I admit I have bought others but only now and then, and I believe sincerely it leads this particular field. I have recently noticed Morey's illustrations on other magazines, of different nature. I hope you don't lose him, for it was he who attracted me to the magazine.

I am not trying to be different, but I advocate a return to the old size, or if not, perhaps trimmed edges, but before all this a return to monthly publication must come. I hope it will come soon.

By the way, there are a few magazines I would like to purchase. Can anyone supply me with the January and February issues of AMAZING STORIES for 1932. The offer is

one half a dollar for both. If this is agreeable to anyone they may drop me a card at the address mentioned.

With best wishes I remain a devoted reader.

THOMAS MCDONALD, 615 East 228th St., Bronx, New York.

(We are really glad to receive an appreciation of the work of Lee Morey. It is far from easy to find an artist to suit every-body. Our line of illustrations is a specialty, and it is liable to run into a monotonous type if not watched and criticized. The writers of other letters have back numbers for sale.—EDITOR.)

#### A Letter of Severe Criticism, a Bit Mixed Up On Dates, But Why Will Some People Write In Pencil?

Editor, AMAZING STORIES:

Don't suppose you print criticisms in your "Discussions"-at least I don't see how you can afford to. AMAZING STORIES is truly decadent. I notice a few compliments here and there describing improvement. After reading your August number, I wonder what the others were like. This is my first AMAZING in a long while and I find it way below your meanest contemporary. I used to read your magazine back in '25 or even before in the large ones with quarterlies and annuals. At that time it was top. Your best artists have left you, your authors and presumably your fans,-why? The plots of all the stories (4) were rather weatherbeaten. M. J. Bruer's yarn was passable. Wonder Williamson doesn't get after Hasse for plagiarism. Fearn does write good stories for other mags, but I can't say much for his "Un"pardon me-"Subconscious." No comment on "Beyond the Stratosphere," doesn't rate any. Lastly you don't vend much for a twobit piece, not that I'm stingy but being hungry for good Science Fiction another good monthly would be most acceptable.

R. W. PARR, San Diego, Calif. U. S. S. "Sandpiper."

(We do not hesitate to publish letters of unfavorable criticism. It has become a regular practice among some of our contemporaries to do this. There is a proverb; False in one thing false in all things. You are a bit muddled in your dates The first number of AMAZINO STORIES was published in 1926. You never read it before that year. Of each of the contemporaries of the con





Genuine Blue-White Diamonds—Fine Watches IUST send your name and address with only \$1.00 de-

posit—stating age, occupation and if possible 1 to 2 credit references. All dealings strictly confidential. Ne direct inquirist — no red tops — no interest or extros — no C.O.D. to pay on arrival.

10 FULL MONTHS TO PAY-10 DAY FREE TRIAL If you can surpass our values anywhere, just return your selec-tion and we will promptly retund your full deposit. If fully satisfied after 10 Day Triol Pariod pay only the small amount stated each month

SATISFACTION GUARANTEED very ring ar watch carries ROYAL'S written guarantee acked by 42 years of fair and square dealing. Make your election now — take 10 months to pay.

Genuine DIAMONDS 52.35 e Month

ng of 14K Solid White or old. Fiery, genuine pla-nter diamond



Only \$2.87 a menth LJ-3 . . BULDVA'S "Gorde of Time"! Guaranteed 17 Jaw BULDVA movement. They square case in charm and color of natur-gold. Silk cord bracelet. On 12.87 a month.



Only \$1.35 a month LJ-4. Ladies, bagueste type wrist watch in streamlined perma-nent waite case; fully guaranteed movement. Matched bracelet. Only 31, 35 a menth.



mond, Initial Ring 1695

**4 Genuine Diamonds** 

4 Genuine Diamonds
1-1-5. Perfectly matched "Queen of Hearts" engagement and wedding ring Foresmble of 148. Solid White or Yellow Cold.
Solid White or Yellow Cold.
blue-white diamond, and the wedding ring with 3 matched diamonds. Socily sol devired. Both for early 22.87 "match the wedding ring with 3 matched diamonds. Socily sol devired. Both for early 22.87 "match 22.88" and 22.88" with 3 matched and 22.88" with 3 matched 22.88" with 3



Only \$2,65 a month

. Dazzling ladies' square prong clus-c, expertly set with seven finely matched renuine diamonds. Looks like a \$450.00 re. 14K Solid Yellow Gold ring. Only

17 Jewel WALTHAM "Diplomat" Only Extra Leather Strap FREE! \$2.37 a menth



2 Diamond Baguette Only \$1.87 e month Unity 31.57 e month
Lise ... One of America's smartest Bagne
wrise watches at an especially low price. Elegar
oryied, modern lifetime case set with 2 gendiamonds; fully guaranteed movement. Sin
link bracelet to match. Reduced to \$19.76
only \$1.57 a month.

**BENRUS** SHOCK-PROOF JAR-PROOF

LJ-12... Nationally known BENRUS at the price of an ordinary watch! Hadd-nomely engraved white case fitted with a fully guaranteed SHOCKITROOP, JAR-PEROOP, BENRUS movement. New type riple link bracelet to match. \$15.98

Shop by Mail and Save!

> Take advantage of our personalized, mail brings the world's finest jewelry to your very door. Absolute satisfaction fully guaranteed.



America's Largest Mail Order | Credit Jewelers Established 1895

32 pages of feature values

170 BROADWAY

Aldrey DEPT 43.T